WHMIS CORE MATERIAL

A RESOURCE MANUAL FOR THE APPLICATION AND IMPLEMENTATION OF WHMIS

Manitoba
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Workplace Safety
and Health

Workplace Safety
and Health Division
Support and
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WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

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IMPORTANT

WHERE MODEL OSH IS MENTIONED IN THE TEXT OF THIS DOCUMENT, THIS REFERS TO THE PROVINCIAL LEGISLATION DEALING WITH WHMIS. IN MANITOBA, THE WHMIS REGULATION IS MR52/88, ADOPTED UNDER THE WORKPLACE SAFETY AND HEALTH ACT.

THIS CORE DOCUMENT DEALS WITH WHMIS REGULATIONS WHICH HAVE LIMITED APPLICATION TO HAZARDOUS WASTES AND FUGITIVE EMISSIONS.

HOWEVER, UNDER THE MANITOBA WORKPLACE HEALTH HAZARD REGULATION (MR53/88) THERE ARE REQUIREMENTS RESPECTING THE LABELLING AND PREPARATION OF MATERIAL SAFETY DATA SHEETS FOR HAZARDOUS WASTES AND FUGITIVE EMISSIONS. THIS REGULATION SHOULD BE CONSULTED FOR FURTHER DETAILS ON THE REQUIREMENTS.

PREFACE

This Manual has been written by the Occupational Safety and Health Division of the Workers' Compensation Board of BC on the request of and with review by the government agencies and business and labour organizations involved with the development of the Workplace Hazardous Materials Information System -- WHMIS.

It is intended as a comprehensive reference source to assist suppliers, employers, workers and agencies with the interpretation and application of WHMIS legislation for the purpose of implementing information programs on hazardous materials in the workplace.

The Manual has seven chapters:

Chapter 1: Introduction to WHMIS

The major elements of WHMIS, its history and legislation.
Acronyms and definitions of legal and technical terms used in the Manual.

Chapter 2: Classification

Responsibilities for classification.
Classification rules and criteria.
Comparison of the WHMIS and TDG classification systems.
Classification worksheets and a case example of classification.

Chapter 3: The Label

Responsibilities for the preparation and application of the different types of WHMIS labels.
Special label provisions for laboratory samples and chemicals.
The design and content of labels required under WHMIS and related legislation.

Chapter 4: The Material Safety Data Sheet (MSDS)

Responsibilities for the preparation and supply of MSDS.
The design and content of data sheets.
Explanation of all information items on data sheets.

Chapter 5: Worker Education

Responsibilities for the education of workers.
The determination of who must be instructed in what.

Chapter 6: Confidential Business Information (Trade Secrets)

Criteria of confidential business information and the mechanism for resolving disputes.
Types of information subject to confidential business information provisions.
How to file a claim and appeal a decision.

Chapter 7: Resources

Resource agencies, reference texts, databases and periodicals which may assist with implementing the hazardous materials information program.

HOW TO USE THE MANUAL

The Chapters in the Manual are arranged to cover the major parts of WHMIS in the approximate order in which they are likely to be addressed in the workplace.

Chapter 1 provides an introduction to WHMIS and gives acronyms and definitions which may be of use when reading the remainder of the Manual.

Chapters 2-6 cover the basic content of WHMIS, in the sequence:

- **classification** (determination of what products are included in WHMIS);
- development and use of **labels** and other means of identification of WHMIS hazardous materials;
- development and use of **material safety data sheets**;
- development of **worker education programs**; and the
- determination of what constitutes **confidential business information** and the way that WHMIS handles trade secrets.

Chapter 7 provides an extensive list of resources which may be useful when assembling information on any product included in the WHMIS information system.

Each Chapter begins with a detailed list of contents and a set of objectives, with the location in the Chapter where the objectives are addressed.

The content in each Chapter is arranged by numbered headings and subheadings for easy reference.

In WHMIS, a convention for abbreviating a reference to the Classes, Divisions and Subdivisions into which a product falls is X-YZ where the Class is given in position X, Division in position Y and Subdivision in position Z. For example, if a product falls into WHMIS Class D, Division 1, Subdivision A, the designation for the product is D-1A.

ACKNOWLEDGEMENTS

The following agencies and organizations have been formally involved with the development of WHMIS. All have contributed directly or indirectly to the content of this Manual. Thanks are also expressed to the Canadian Centre for Occupational Health and Safety for information provided for the database section of Chapter 7.

Federal Agencies

- Consumer and Corporate Affairs
- Hazardous Materials Information Review Commission
- Health and Welfare Canada
- Labour Canada

Provincial and Territorial Agencies

Alberta

- Occupational Hygiene Branch
  Community and Occupational Health

Manitoba

- Workplace Safety and Health Division
  Department of Environment and Workplace Safety and Health

New Brunswick

- Health and Safety Services
  Occupational Health and Safety Commission

Newfoundland

- Occupational Health and Safety Branch
  Department of Labour

Northwest Territories

- Safety Division
  Justice and Public Service

Nova Scotia

- Occupational Health and Safety Division
  Department of Labour

Ontario

- Strategic Policy Unit
  Ontario Ministry of Labour

Prince Edward Island

- Occupational Health and Safety Division
  Department of Labour

Québec

- Commission de la Santé et de la Securité du Travail

Saskatchewan

- Occupational Health and Safety Branch
  Department of Labour

Yukon

- Labour Services
  Department of Justice

Industry and Labour

- Canadian Chemical Producers' Association
- Canadian Labour Congress
- Canadian Manufacturers' Association

CHAPTER 1

INTRODUCTION TO WHMIS

CONTENTS

Page

1.1 CHAPTER OBJECTIVES 1

1.2 WHMIS: RATIONALE AND KEY ELEMENTS 2

1.3 HISTORY AND DEVELOPMENT OF WHMIS 3

1.4 WHMIS LEGISLATION - IN BRIEF 5

1.5 COMPLIANCE MECHANISMS 6

Appendix A: Acronyms Used in the Manual 7

Appendix B: Definitions of Legal and Technical Terms 9

1.1 CHAPTER OBJECTIVES

	Objectives	Location in Chapter
1.	To describe what WHMIS is, its rationale and major elements.	1.2
2.	To review the history and development of WHMIS.	1.3
3.	To list the major pieces of WHMIS legislation and describe their functions.	1.4
4.	To describe compliance mechanisms and penalties which accompany WHMIS legislation.	1.5
5.	To provide a list of acronyms, particularly of agencies and legislation, used in the Manual.	Appendix A
6.	To provide definitions of legal and technical terms used in the Manual.	Appendix B

1.2 WHMIS: RATIONALE AND KEY ELEMENTS

The Workplace Hazardous Material Information System (WHMIS) is a nationwide system to provide information on hazardous materials used in the workplace. WHMIS recognizes the interests of workers, employers, suppliers and regulators, balancing the worker's right to know with industry's right to protect confidential business information.

Exposure to hazardous material can cause or contribute to a variety of health effects such as irritation, burns, sensitization, heart ailments, kidney and lung damage and cancer. Some materials may also be safety hazards that can contribute to fires, explosions and other accidents if improperly stored or handled.

Findings of a recent federal social-economic impact analysis estimated the social costs of exposure to hazardous materials in the workplace to be about $600 million a year. Approximately one in four Canadian workers is exposed to chemical hazards on the job.

Due to the seriousness of these safety and health problems and the lack of information available to employers and employees, the federal-provincial-territorial governments agreed to implement WHMIS with the goal of reducing the incidence of illness and injury caused by hazardous materials in the workplace.

WHMIS is, at heart, a system of information delivery with three key elements:

- **Labels** on hazardous materials and their containers which alert employers and workers to the dangers of products and basic safety precautions;
- **Material Safety Data Sheets (MSDS)** -- technical bulletins which provide detailed hazard and precautionary information on the product; and
- **Worker Education** programs which provide instruction on hazards and training in work procedures.

WHMIS also includes mechanisms for ruling on claims by suppliers and employers for the right to withhold product information from labels and MSDS's for reasons of confidential business information (trade secrets) and for appeals to these rulings.

1.3 HISTORY AND DEVELOPMENT OF WHMIS

WHMIS has been developed over a period of almost a decade, through consultation and the collective efforts of industry, labour and federal-provincial-territorial governments.

Chronology of Events

January 1979	Working group of the Occupational Safety and Health Committee of the Canadian Association of Administrators of Labour Legislation (CAALL OSH) was formed to review current legislation in Canada for labelling hazardous substances.
May 1981	Federal-provincial-territorial Task Force chaired by Consumer and Corporate Affairs formed to study the feasibility of labelling hazardous substances.
April 1982	CAALL OSH Committee submitted a final report on labelling to the CAALL Executive. Members agreed to extend the concept to a material information delivery system for hazardous materials. Labour Canada was asked to establish a tripartite consultative process to develop a proposal for the system.
February 1983	First meeting of the tripartite WHMIS Steering Committee was held. Working groups were established with participation by industry, labour and government representatives.
April 1985	The steering committee publishes: Workplace Hazardous Materials Information System - Report of the Project Steering Committee.
May 1986	Deputy Ministers of Labour and heads of OSH agencies agreed to the formation of an Intergovernmental Implementation Coordinating Committee (ICC).
January 1987	Consultative process begun involving federal, provincial and territorial governments, industry and labour on drafting of federal WHMIS legislation under the Hazardous Products Act (HPA), and complementary Model OSH Regulations to be used as a basis by all OSH agencies.
June 1987	Federal legislation under Bill C-70 to amend HPA, the Canada Labour Code (Part IV) and other related federal legislation, and to introduce Hazardous Materials Information Review Act (HMIRA) receives Royal Assent, enabling implementation of WHMIS on a national basis by 31 October 1988.

January 1988	*Controlled Products Regulations* and the Ingredient Disclosure List under HPA, and confidentiality criteria regulations under HMIRA and amendments to the *Canada Occupational Safety and Health Regulations* under the Canada Labour Code (IV) published in final approved form in Part II of the Canada Gazette.
Spring 1988	Consultative process continues, involving government, industry and labour, for the development of Model Occupational Safety and Health Regulations for WHMIS workplace requirements, and for the development of policy for the implementation of the information system.

1.4 WHMIS LEGISLATION - IN BRIEF

WHMIS will be implemented by a combination of federal and provincial legislation.

The federal **Hazardous Products Act** as amended by Bill C-70 (Chapter 30 [1987] of the Statutes of Canada) requires suppliers of hazardous materials called controlled products to provide adequate labels and MSDS's as a condition of sale and importation.

The ***Controlled Products Regulations***, issued under the authority of the Hazardous Products Act, contain requirements which specify the form and content of supplier labels, the types and arrangement of information on material safety data sheets, conditions of exemption and the details of the criteria that define a controlled product.

The **Ingredient Disclosure List** issued pursuant to subsection 17(1) of the Hazardous Products Act contains the names of chemicals which must be identified on material safety data sheets if they are present in controlled products above a specified concentration.

Federal and provincial Occupational Safety and Health (OSH) legislation will require employers to provide labels, MSDS's and worker education programs in the workplace. The model for this legislation is provided by the **Workplace Hazardous Materials Information System Regulations (Model OSH Regulations)**.

The **Hazardous Materials Information Review Act** establishes a Commission to rule on claims and appeals related to exemptions from disclosure of confidential business information. The ***Hazardous Materials Information Review Regulations*** provide criteria for determining the validity of a claim for exemption.

1.5 COMPLIANCE MECHANISMS

- The responsibility for ensuring compliance of suppliers with the Hazardous Products Act and the pursuant *Controlled Products Regulations* is delegated to the provinces and territories who will carry out inspection programs. Consumer and Corporate Affairs Canada, in cooperation with Customs and Excise Canada, will exercise control on imports at point of entry.

  The penalties under the Hazardous Products Act are:

  - on summary conviction, to a fine not exceeding one hundred thousand dollars or to imprisonment for a term not exceeding six months or to both; or
  - on proceedings by way of indictment, to a fine not exceeding one million dollars or to imprisonment for a term not exceeding two years or to both.

- The Hazardous Materials Information Review Commission is responsible for ensuring compliance with the Hazardous Materials Information Review Act. Penalties under the HMIR Act are the same as under HPA.

- Labour Canada and provincial and territorial occupational safety and health regulatory agencies will carry out inspection programs under the legislation adopted by each agency for the purposes of applying WHMIS to employers and the workplace. The penalties under such workplace legislation are established separately by the statutes that apply to each jurisdiction.

APPENDIX A

ACRONYMS USED IN THE MANUAL

ACGIH	American Conference of Governmental Industrial Hygienists
AEC	Atomic Energy Control (Agency)
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BSI	British Standards Institute
CAALL	Canadian Association of Administrators of Labour Legislation
CANUTEC	Canadian Transport Emergency Centre
CAS	Chemical Abstracts Service
CBI	Confidential Business Information
CCAC	Consumer and Corporate Affairs Canada
CCCR	*Consumer Chemicals and Containers Regulations*
CPR	*Controlled Products Regulations*
CSA	Canadian Standards Association
EEC	European Economic Community
EPA	Environmental Protection Agency (US)
FDA	Food and Drug Administration (US)
HPA	Hazardous Products Act
HMIRA	Hazardous Materials Information Review Act
HMIRC	Hazardous Materials Information Review Commission
HWC	Health and Welfare Canada
IARC	International Agency for Research on Cancer
IDLH	Immediately Dangerous to Life and Health
LC	Lethal Concentration
LD	Lethal Dose
MRC	Medical Research Council (of Canada)
MSDS	Material Safety Data Sheet
NACE	National Association of Corrosion Engineers
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OECD	Organization for Economic Cooperation and Development
OSHA	Occupational Safety and Health Administration (US)
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization

APPENDIX B

DEFINITIONS OF LEGAL AND TECHNICAL TERMS

About to be	A phrase which when used in the sense of "about to be appropriately labelled" is generally understood to mean within one work shift.
Absolute pressure	Pressure measured with respect to zero pressure, contrasted with gauge pressure which is measured with respect to atmospheric.
ACGIH	American Conference of Governmental Industrial Hygienists; publishes annual recommendations regarding safe limits for exposure to chemical and physical agents.
Acid	A corrosive chemical with a pH value less than 7.
Active ingredient (a.i.)	The ingredient in a chemical formulation which produces the intended effect.
Acute exposure	A single exposure to a substance or multiple exposures occurring within a short time, usually 24 hours or less. See also "Chronic exposure" and "Subchronic exposure".
Acute lethality	The death of animals immediately or within 14 days after a single administration of or exposure to a toxic substance.
Acute toxic effect	An adverse effect in a human or animal, with severe symptoms developing rapidly and coming quickly to a crisis. Also see "Chronic toxic effect".
Acute toxicity	The adverse (acute) effects resulting from a single dose of or exposure to a substance. Ordinarily used to denote effects in experimental animals.
Aerosol	A dispersion of solid or liquid particles suspended in air.
Aerosol container	A disposable container designed to release pressurized contents by means of a manually operated valve which forms an integral part of the container.

Affected party	In respect of any provision of the Hazardous Materials Information Review Act, has the meaning to be assigned by regulation pursuant to that Act. As a working definition, "affected party" includes a supplier, employer, employee, employee representative including relevant trade union staff and officers, or health and safety committee members.
ANSI	American National Standards Institute; a US organization that develops standards related to labels and the safe design and performance of equipment.
Antidote	A remedy used to counteract the effects of a poison.
Aplastic anemia	A condition in which the bone marrow fails to produce an adequate number of red blood cells.
Applicable information	Means with respect to completing MSDS's that the information on the product can help workers to properly and safely store, handle, use or dispose of the product.
Applied	A label is applied to a controlled product or container in which a controlled product is packaged if the label is attached to, imprinted on, stencilled on, or embossed on the controlled product or container or, in the case of a bulk shipment of a controlled product, is included with or caused to accompany the bulk shipment in the manner prescribed.
Aqueous	A term used to indicate the presence of water in a solution.
Aromatic solvents	Derivatives of benzene having strong, pleasant odours. They penetrate the skin and may be dangerous to breathe (e.g. toluene, xylene, phenol, and cresol).
Asphyxiant	A vapour or gas which can cause unconsciousness or death by suffocation. Two types are: 1. Simple asphyxiants - physiologically inert gases which, if present in excess, may dilute oxygen in air to dangerously low levels. Common examples include methane, nitrogen, argon. 2. Chemical asphyxiants - prevent normal delivery of oxygen to body tissues by interfering with the uptake of oxygen by the blood (example: carbon monoxide), or interfering with the ability of cells to use oxygen (example: hydrogen cyanide).

ASTM	American Society for Testing and Materials; US organization which produces standards for materials, sampling techniques and testing methods.
At a later time	A phrase which, when used in a situation where a controlled product will be labelled at a later time and a placard must be posted in the interim, generally means a period of time longer than one work shift.
Autoignition temperature	Temperature at which the vapour from a liquid will ignite without a source of ignition such as a spark or flame.
Available information	Means, with respect to completing MSDS's, that the person responsible for preparing the data sheet has the information or could obtain it.
Boiling point	The temperature at which a liquid changes to a vapour state, at a given pressure (usually sea level pressure of 760 mm Hg).
Bonding	When transferring liquid from one container to another, refers to making an electrically conductive connection between the discharge container and the receiving container in order to eliminate the possibility of an electrical spark due to static discharge.
Bulk shipment	"Bulk shipment" means a shipment of a controlled product that is contained, without intermediate containment or intermediate packaging, in 1. a vessel with a water capacity of more than 454 litres, 2. a freight container, a road vehicle, a railway vehicle, a portable tank, a freight container carried on a road vehicle, a railway vehicle, ship or aircraft or a portable tank carried on a road vehicle, a railway vehicle, ship or aircraft, 3. the hold of a ship, or 4. a pipeline.
"C" or ceiling	The maximum allowable human exposure limit for an airborne substance; not to be exceeded even momentarily. Also see "Exposure limit" and "TLV".

Canister	A container filled with adsorbent materials, and designed, as part of a respirator, to remove gases and vapours from the air before they are breathed in by a worker.
Carcinogen	A substance or agent capable of producing cancer in mammals.
Carrier	A material mixed with active ingredients to make a formulation, e.g. finely ground clay, diatomaceous earth, water, gas propellant.
Cartridge	The small, detachable part of an air-purifying respirator which is designed to adsorb gases and vapours from the air.
CAS registry number	The identification number assigned to a chemical substance by the Chemical Abstracts Service Division of the American Chemical Society.
Caustic	A corrosive chemical with a pH value more than 7. (May also be called "Base" or "Alkali".)
CBI	See "Confidential business information".
cc	Cubic centimetre; a volume measurement in the metric system, equal in capacity to one millilitre (ml).
Chemical cartridge respirator	A non-emergency air-purifying respirator provided with one or more cartridges specific to various gases or vapours.
Chemical family	A group of single elements or compounds with similar chemical characteristics. For example, acetone, methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK) are in the "ketone" family. Ketones are used in paints, solvents and in plastics production. Health effects of human exposure to ketones include lung, nose and throat irritation, dermatitis and narcosis.
Chemical formula	A combination of chemical symbols defining a chemical. It represents the proportions of the elements that make it up. For example, H_2O is the formula for water.
Chief Appeals Officer	The Chief Appeals Officer appointed pursuant to Section 38 of the Hazardous Materials Information Review Act.

Chief Screening Officer	The Chief Screening Officer appointed pursuant to Section 38 of the Hazardous Materials Information Review Act.
Chronic exposure	Repeated exposure to a substance over a relatively long period of time (typically more than ten per cent of lifetime in laboratory studies). See also "Acute exposure" and "Subchronic exposure".
Chronic toxic effect	An adverse effect to the health of a person or test animal that develops: 1. over time, following a single exposure to a toxic substance; or 2. from prolonged or repeated exposure to a toxic substance under conditions that do not produce that effect from a single exposure. See also "Acute toxic effect".
Coefficient of water/oil distribution	The ratio of the solubility of a product in water to its solubility in n-octanol.
Combustible liquid	Liquids with flashpoints 100°F (37.8°C) or more but less than 93.3°C (200°F) when tested according to the applicable method in Schedule IV of the *Controlled Products Regulations*.
Commission	The Hazardous Material Information Review Commission established by Subsection 28(1) of the Hazardous Materials Information Review Act.
Common chemical name	The simple chemical name of a chemical as opposed to its trade name or its technically precise IUPAC name. For example, the pesticide with the common chemical name carbaryl has a trade name Sevin and the full scientific name of L-naphthyl-N-methyl carbamate.
Complex mixture	A mixture that is a combination of many chemicals, has a commonly known generic name and is: 1. naturally occurring; 2. a fraction of a naturally occurring mixture that results from a separation process; or 3. a modification of a naturally occurring mixture or a modification of a fraction of a naturally occurring mixture that results from a chemical modification process.

Concentration	The relative amount of a substance when combined or mixed with other substances. Examples: 2 ppm hydrogen sulfide in air, or a 50 per cent caustic solution.
Confidential business information	Product information withheld from labels or MSDS's for a specified period of time in the case of a valid claim for exemption from WHMIS disclosure requirements on the basis of criteria in the *Hazardous Materials Information Review Regulations.*
Container	Includes a bag, barrel, bottle, box, can, cylinder, drum or similar package or receptacle. Under Model OSH Regulations the term includes storage tanks, but under HPA and CPR it does not. See also "Outer container".
Controlled product	Any product, material, or substance specified by the regulations made pursuant to paragraph 15(1)(a) of the Hazardous Products Act to be included in any of the Classes listed in Schedule II of that Act.
Corrosive	A material that causes visible destruction or irreversible alterations in human skin tissue at the site of contact or that has a severe corrosion rate on steel or aluminum.
Cosmetic	As defined in the Food and Drugs Act, means any substance or mixture of substances manufactured, sold or represented for use in cleansing, improving or altering the complexion, skin, hair or teeth, and includes deodorants or perfumes .
Critical temperature	The temperature above which a substance can exist only as a gas and cannot be converted to a liquid by pressure.
CSA	Canadian Standards Association; a voluntary association chartered under the Standards Council of Canada which sets design and procedures standards.
Decomposition	Breakdown of a substance by heat, chemical reaction, biological, decay, or other processes into parts or elements or simpler compounds.
Dermal	Used on or applied to the skin.
Dermal toxicity	Adverse effects resulting from skin exposure to a substance. Ordinarily used to denote effects in experimental animals.

Dermatitis	Inflammation of the skin caused by an irritant substance.
Detoxify	To make harmless; to neutralize a poison; to remove a poisonous effect.
Drug	As defined in the Food and Drugs Act, includes any substance or mixture of substances manufactured, sold or represented for use in: 1. the diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state, or the physical symptoms thereof, in man or animal; 2. restoring, correcting or modifying organic functions in man or animal; or 3. disinfection in premises in which food is manufactured, prepared or kept.
Dust	Solid airborne particles that are mechanically generated.
Education	All those activities including instruction which provide knowledge and skills to workers so that they may work safely with, or in proximity to, controlled products in the workplace. See also "Instruction" and "Training".
Embryotoxicity	See "Teratogenicity and embryotoxicity".
Employer	Specific meaning is established by the appropriate occupational regulatory authority. In general, refers to that person who has in service under a contract of hiring or apprenticeship, written or oral, express or implied a person engaged in work in or about a workplace.
Emulsion	A mixture of two or more immiscible liquids, such as oil and water, where one is suspended or dispersed in the other in the form of minute droplets and remains suspended or dispersed for a period of time. An emulsifier may be used to assist the dispersion.
EPA	Environmental Protection Agency; a US agency with environmental regulatory and enforcement authority.

Epidemiology	The science which deals with the study of disease in a general population, its incidence (rate of occurrence) and distribution (for example, by age, sex, or occupation).
Evaporation	The transformation of a liquid or solid into a vapour.
Evaporation rate	The rate at which a particular material will vaporize (evaporate) relative to butyl acetate, ether or other specified solvent.
Explosive	As defined in the Explosives Act means any substance that is made, manufactured or used to produce an explosion or detonation or a pyrotechnic effect and includes gunpowder, propellant powders, blasting agents, dynamite, detonating cord, lead azide, detonators, ammunition, rockets, fireworks, safety flares or other signals.
Exposure	A condition of contact between a person and a hazardous substance. Contact may be oral, dermal or respiratory.
Exposure limit	A maximum limit of exposure to an air contaminant. Three types of limits in common use are: 1. Exposure Limit - TWA - The time-weighted average concentration for a normal 8-hour work day or 40-hour work week to which nearly all workers can be repeatedly exposed without adverse effect. 2. Exposure Limit - STEL - The short-term exposure limit, i.e. the maximum concentration to which workers can be periodically exposed for a period up to 15 minutes without suffering from irritation, chronic or irreversible tissue change, or narcosis of sufficient degree to increase accident proneness, or impair ability for self-rescue. 3. Exposure Limit - C - The ceiling concentration of an airborne substance that must not be exceeded at any time. This limit is applied to substances that are predominately irritant or fast-acting and for which the TWA is inappropriate.
Flame projection	The ignited discharge of the pressurized contents of an aerosol container. See also "Flashback".

Flammable limits	The upper and lower concentrations of a gas or vapour in air between which an explosion or propagation of flame will occur when an ignition source is present. See also "LEL (LFL)" and "UEL (UFL)".
Flammable liquid	A liquid with a flashpoint below 100°F (37.8°C) when tested according to the appropriate method in Schedule IV of the *Controlled Products Regulations*. See also "Combustible liquid".
Flammable range	The concentration range in which a gas or vapour is flammable in air between the flammable limits.
Flammable solid	Solids which meet any of four criteria in CPR, Section 39.
Flashback	That part of a flame projection that extends from its point of ignition back to the aerosol container. See also "Flame projection".
Flashpoint	The minimum temperature at which a liquid gives off enough vapour to ignite in the presence of a source of ignition under specified test conditions. Flashpoints will vary for the same material depending on the method used. Appropriate methods are provided in Schedule IV of the *Controlled Products Regulations*.
Fugitive emission	"Fugitive emission" means a gas, liquid, solid, vapour, fume, mist, fog or dust containing a controlled product that escapes from process equipment, emission control equipment, a product or a device in the workplace or from any facility which constitutes a workplace or part of a workplace.
Fume	Solid particles condensed in air that are generated by condensation from the vapour of a solid material. Fumes are produced in, for example, welding operations, and often accompanied by a chemical reaction, such as oxidation.
g	Gram; a metric unit of weight. One pound is about 454 grams.
Gas	A substance that is in the gaseous state at ordinary temperature and pressure.
General exhaust ventilation	A system for exhausting air containing contaminants from a general work area. Also see "Local exhaust".
Generic instruction	Instruction of workers in WHMIS hazard information without reference to specific products or worksites.

Generic material safety data sheet	A single data sheet which applies to a number of similar products.
Half life	The period of time for a chemical or radioactive substance to lose half its concentration or activity due to metabolic uptake, decay or other chemical change.
Hazard information	Information on the proper and safe storage, handling and use of a controlled product and includes information relating to its toxicological properties.
Hazard symbol	Includes any design, mark, pictogram, sign, letter, word, number, abbreviation or any combination thereof that is to be displayed on a controlled product or container in which a controlled product is packaged in order to show the nature of the hazard of the controlled product.
Hazardous product	Any prohibited product, restricted product or controlled product.
Hazardous waste	A controlled product that is intended for disposal or is sold for recycling or recovery.
High-efficiency particulate air filter (HEPA)	A filter that has been tested to assure an efficiency equal to or exceeding 99.97% for removal of particles having a mean aerodynamic diameter of 0.3 microns.
IARC	International Agency for Research on Cancer.
IDLH	Immediately Dangerous to Life and Health. An atmosphere where the concentration of oxygen or flammable or toxic air contaminants would cause a person without respiratory protection to be fatally injured or would cause irreversible and incapacitating effects on that person's health.
Ignition source	A condition such as flame, static discharge or heat capable of contributing to ignition of flammable or combustible materials.
Immediate use	A phrase which, when used with reference to the use of the contents of a portable container, means to be used at once, without delay.

In proximity to	With reference to "working in proximity to a controlled product" means the area in which worker health and safety could be at risk during the storage, handling use or disposal of the product, or emergencies such as accidental release or spill.
In vitro	Refers to laboratory studies performed outside living organisms; for example, in glass (vitro) test tubes, or Petri dishes.
In vivo	Refers to laboratory studies performed inside living organisms.
Incompatible	Materials which could cause dangerous reactions from direct contact with one another are described as incompatible. For example, the salt, sodium cyanide, will produce hydrogen cyanide gas on contact with water. Some incompatible materials fall into WHMIS Class F, Dangerously Reactive Material.
Ingestion	Intake of a substance through the mouth.
Ingredient Disclosure List	The Ingredient Disclosure List established by the Governor in Council pursuant to the Hazardous Products Act, for the purposes of assisting with the determination of what hazardous ingredients of a controlled product must be reported on the material safety data sheet.
Inhalation	The breathing in of a substance.
Inhibitor	A chemical which is added to another substance to prevent an unwanted chemical change from occurring.
Inorganic chemicals	Generally, chemicals that do not contain carbon; for example, sodium chloride (table salt).
Instruction	The methodical teaching of information. See also "Education", "Training".
Irritant	A substance which, with sufficient contact, will cause reversible inflammation of the eye, skin, or respiratory system. The contact may be a single or multiple. Primary irritants which cause irritation at the site of contact include many acids, caustics, amines, metallic salts, and ketones. Secondary irritants can cause reactions at locations away from the site of contact. See also "Dermatitis".

kg	Kilogram; a metric unit of weight, about 2.2 pounds. Also see "g" and "mg".
kPa	Kilopascals; a unit of pressure (1 atmosphere equals 101.3 kPa).
L	Litre; a metric unit of volume, equal to 1,000 cubic centimetres.
Label	Includes any mark, sign, device, stamp, seal, sticker, ticket, tag or wrapper.
Laboratory	A place devoted to experimental study in any branch of natural science or to the application of scientific principles in testing and analysis. A lab includes non-traditional settings such as field testing locations with or without an enclosure, and production line testing stations.
Laboratory sample	In respect of a controlled product, a sample of the controlled product that is intended solely to be tested in a laboratory but does not include a controlled product that is to be used: 1. by the laboratory for testing other products, materials or substances; or 2. for educational or demonstration purposes.
LC_{50}	"Lethal concentration $_{50}$"; as defined by the *Controlled Products Regulations*, means the concentration of a substance in air that, when administered by means of inhalation over a specified length of time in an animal assay is expected to cause the death of 50 per cent of a defined animal population. LC_{50} criteria in the *Controlled Products Regulations* are based on 4-hour exposures. (In the broadest sense, LC_{50}'s are also determined by administration of substances to aquatic life in water.) The LC_{50} is expressed by volume as parts of substance per million parts of air (ppm) for gases and vapours, or by weight as milligrams of material per litre or cubic metre of air (mg/L or mg/m^3) for dusts, mists and fumes.
LD_{50}	"Lethal dose $_{50}$"; a single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50 per cent of a defined animal population. The LD_{50} dose is usually expressed as milligrams or grams of material per kilogram of animal body weight (mg/kg or g/kg).

LEL or LFL	Lower explosion limit or lower flammable limit of a vapour or gas; the lowest concentration of the substance in air that will produce a flash of fire when an ignition source is present. At concentrations lower than the LEL, the mixture is too "lean" to burn. Also see "UEL".
Leukemia	A blood disease characterized by the over-production of white blood cells.
Lipophilic properties	Affinity of a product for fatty tissue.
Local exhaust ventilation	A system for capturing and exhausting contaminants from the air at the point where the contaminants are produced (for example, during welding, grinding, or similar operations). Also see "General exhaust".
m^3	Cubic metre; a metric measure of volume equal to 1,000 litres.
Manufactured article	Any article that is formed to a specific shape or design during manufacture, the intended use of which when in that form is dependent in whole or in part on its shape or design, and that, under normal conditions of use, will not release or otherwise cause a person to be exposed to a controlled product.
Material safety data sheet	A document disclosing the information referred to in subparagraphs 13(a)(i) to (v) of the Hazardous Products Act. A technical bulletin which provides detailed hazard and precautionary information on a controlled product.
Mechanical exhaust ventilation	A powered device such as a fan or venturi tube for exhausting contaminants from a workplace.
Medical professional	"Medical professional" means a person who is 1. entitled to practice medicine, or 2. registered as a registered nurse, under the laws of the Province of Manitoba.
Mist	Liquid droplets suspended in air that are produced by dispersion of a liquid or by the condensation of a vapourized liquid.
Mixture	A combination of two or more products, materials or substances that does not undergo a chemical change as a result of interaction between the products, materials or substances.

Mutagenicity	The capability of a substance to cause mutations in living cells. Mutations may occur in either germ (reproductive) cells or somatic (body) cells.
NACE	National Association of Corrosion Engineers (US).
NBUAC or n-BuAc	Normal butyl acetate; an organic compound given the evaporation rate of 1. See "Evaporation rate".
NFPA	National Fire Protection Association; a US organization which promotes fire protection and prevention. NFPA produces National Fire Codes such as #704, a code for showing hazards of materials using a diamond-shaped label or placard with appropriate numbers or symbols.
NIOSH	National Institute for Occupational Safety and Health; federal US agency which tests and certifies respiratory protective devices and air sampling detector tubes.
Normal atmospheric pressure	An absolute pressure of 101.325 kilopascals (1.00 atmosphere) at 20°C (68°F).
Nurse	Means a registered nurse as defined by The Registered Nurses Act.
Odour threshold	The lowest airborne concentration of a chemical that can be perceived by the sense of smell.
OECD	Organization for Economic Cooperation and Development, which produces OECD Guidelines for Testing of Chemicals.
Oncogenic	The ability to create tumors in tissue.
Oral	Taken into the body through the mouth.
Oral toxicity	Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.
Organic chemicals	Generally, chemical compounds containing carbon; for example, styrene.
OSHA	Occupational Safety and Health Administration (US); federal agency with safety and health regulatory and enforcement authority.

Outer container	The most outward container of a controlled product that is visible under normal conditions of storage and handling. See also "Container".
Oxidation	A reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent.
Oxidizer	A substance which readily yields oxygen or equivalent to stimulate the combustion (oxidation) of organic matter. Chlorate ($C10_3$), permanganate (MnO_4), and nitrate (NO_3) compounds are examples of oxidizers. Oxidizers are incompatible with flammable materials.
Package liner	A special case of an inner container which would normally be kept in the outer container during product storage and use.
Packing Groups	Under the Transportation of Dangerous Goods Regulations, Packing Groups are categories of hazard to which products are assigned within Classes 3, 6 and 8.
Per cent volatile	Per cent volatile by volume; the percentage of a liquid or solid (by volume) that will evaporate at a temperature of 21°C (70°F) (unless some other temperature is stated). Examples: butane, gasoline, and paint thinner (mineral spirits) are 100% volatile.
Personal protective equipment	Devices worn by workers to protect against hazards in the environment; for example, respirators, gloves and face shields.
Pest control product	As defined in the Pest Control Products Act, any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest, and includes: 1. any compound or substance that enhances or modifies or is intended to enhance or modify the physical or chemical characteristics of a control product to which it is added; and 2. any active ingredient used for the manufacture of a control product.

pH	An expression on a scale from 0 to 14 of the extent of acidity or alkalinity of a substance. Materials with pH 7 are neutral. Those below pH 7 are acidic and those above are caustic.
Pictogram	Refers to the stylized graphical material which appears within a hazard symbol; for example, a skull and crossbones, stylized "T", flame, etc.
PMCC	Pensky-Martens Closed Cup; a flashpoint test method.
Polymerization	A chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is one that takes place at a rate which releases large amounts of energy.
Powered air-purifying respirator (PAPR)	An air-filtering respirator that employs an electrically powered pump to deliver air to a face piece or head covering, and that meets minimum air flow requirements set by NIOSH.
ppb	Parts per billion; a unit for measuring the concentration of a gas or vapour in air -- parts (by volume) of the gas or vapour in a billion parts of air. Usually used to express measurements of extremely low concentrations of unusually toxic gases or vapours.
ppm	Parts per million; a unit often used for measuring the concentration of a gas or vapour in air -- parts (by volume) of the gas or vapour in a million parts of air.
Product Identification Number	The number and letter, if any, specified in column II of an item of List II in Schedule II to the Transportation of Dangerous Goods Regulations that correspond to the product specified in column I of an item of that List.
Product identifier	In respect of a controlled product, the brand name, code name, or code number specified by a supplier or the chemical name, common name, generic name or trade name.
Prohibited product	Any product, material or substance included in Part I of Schedule I of the Hazardous Products Act.

Radioactive presribed substance	As defined in the Atomic Energy Control Act, means uranium, thorium, plutonium, neptunium, deuterium, their respective derivatives and compounds and any other substances that the Atomic Energy Control Board may by regulation designate as being capable of releasing atomic energy or as being requisite for the production, use or application of atomic energy.
Reaction	A chemical transformation or change; the interaction of two or more substances to form new substances.
Reactivity	A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects -- such as pressure buildup, temperature increase, formation of toxic, or corrosive by-products -- may occur because of the reactivity of a substance to heating, burning, direct contact with other materials or other conditions in use or in storage.
Readily available	In reference to a material safety data sheet, means present in an appropriate place in a physical copy form that can be handled.
Reducing agent	In a reduction reaction (which always occurs simultaneously with an oxidation reaction), the reducing agent is the substance which combines with oxygen or donates electrons to the reaction. See "Oxidation".
Reproductive toxicity	The effect of a product on the capability of persons or test animals to produce offspring.
Research and development	Systematic investigation or search carried out in a field of science or technology by means of experiment or analysis, other than investigation or search in respect of market research, sales promotion, quality control or routine testing of controlled products, and includes: 1. applied research; namely, work undertaken for the advancement of scientific knowledge with a specific practical application in view; and 2. development; namely, use of the results of applied research for the purpose of creating new, or improving existing, processes or controlled products.
Respirator	A personal protection device designed to protect the wearer from inhalation of a hazardous atmosphere.

Respiratory tract sensitization	The development in a person who is not atopic (allergic) of severe asthma-like symptoms on exposure to a substance to which the person has been exposed. See also "Sensitizer" and "Skin sensitization".
Restricted product	Any product, material or substance included in Part II of Schedule I of the Hazardous Products Act.
Risk phrase	"Risk phrase" means, in respect of a controlled product or a class or division of controlled products, a statement identifying a hazard that may arise from the intended use of or exposure to the controlled product or the class or division of controlled products.
Sell	Includes offer for sale, expose for sale and distribute.
Sensitizer	A substance which on first exposure causes little or no reaction in man or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form in industry although respiratory sensitization also occurs. See also "Respiratory tract sensitization" and "Skin sensitization".
SETA	Setaflash Closed Tester; a flashpoint test method.
Silicosis	A degenerative disease of the lungs caused by the inhalation of substances which contain free silica.
Skin sensitization	An immunologically mediated cutaneous reaction in a person or test animal that is not atopic (allergic) on exposure to a substance to which the person or animal has previously been exposed. See also "Respiratory tract sensitization" and "Sensitizer".
Smoke	Aerosols, gases, and vapours resulting from incomplete combustion.
Solubility in water	A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. Solubility information can be useful in determining spill cleanup methods and fire-extinguishing agents and methods for a material. Terms used to express solubility are:

negligible	Less than 0.1 per cent
slight	0.1 to 1.0 per cent
moderate	1 to 10 per cent
appreciable	more than 10 per cent
complete	soluble in all proportions

Solvent	A liquid which will dissolve another substance.
Specific gravity	The weight of a material compared to the weight of an equal volume of water. Example: If a volume of a material weighs 8 grams, and an equal volume of water weighs 10 grams, the material is said to have a specific gravity of 0.8. Insoluble materials with specific gravity of less than 1.0 will float in water; insoluble materials with specific gravity greater than 1.0 will sink.
Statistically significant	Shown by statistical procedures to have a high probability of being due to something other than chance.
Subchronic exposure	In laboratory tests, usually refers to toxic effects associated with repeated exposure of a test animal to a substance, not exceeding ten per cent of average lifetime. See also "Acute exposure" and "Chronic exposure".
Supplier	A person who is a manufacturer, processor or packager of a controlled product or a person who, in the course of business, imports or sells controlled products.
Supplier identifier	The name of a supplier of a controlled product.
Supplier label	A label provided by a supplier disclosing the information and displaying the hazard symbols referred to in paragraph 13(b) of the Hazardous Products Act.
Supplier material safety data sheet	A material safety data sheet provided by a supplier disclosing the information referred to in subparagraphs 13(a)(i) to (v) of the Hazardous Products Act.
TCC	TAG (Tagliabue) Closed Cup; a flashpoint test method.
TDG	Refers to the Transportation of Dangerous Goods Act and pursuant regulations.

Teratogenicity and embryotoxicity	The capability of a product to produce injuries such as death, physical malformation, permanent metabolic or physiological dysfunction, growth retardation or psychological or behavioural alteration in offspring resulting from exposure of the pregnant female to the product, and at a concentration that has no adverse effect on the female.
TLV	Threshold Limit Value; a term used by ACGIH to express the airborne concentration of a material to which nearly all persons can be exposed day after day, without adverse effects. See also "Exposure limit".
Toxicity	The adverse effects resulting from exposure to a material, generally by the mouth, skin, or respiratory tract.
Trade name	The trademark name or commercial trade name for a material.
Trade secret	See "Confidential business information".
Training	One type of instruction in which workers are taught specific work procedures. See also "Instruction" and "Education".
Transmit	To transmit by any physical, electronic, optical or other means.
TWA	Time Weighted Average exposure; the airborne concentration of a material to which a person is exposed when calculated as a weighted average over a period of time.
UEL or UFL	Upper explosive limit or upper flammable limit of a vapour or gas; the highest concentration of the substance in air that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At higher concentrations, the mixture is too "rich" to burn. Also see "LEL".
Unstable	Tending toward decomposition or other unwanted chemical change during normal handling or storage.
Vapour	The gaseous form of a substance that is found in a solid or liquid state at normal atmospheric pressure (i.e. an absolute pressure of 101.325 kPa at 20°C).
Vapour density	The weight of a vapour or gas compared to the weight of an equal volume of air.

Vapour pressure	The pressure exerted by a saturated vapour above its own liquid in a closed container. Vapour pressures are reported in millimetres of mercury (mmHG) at 20°C (68°F), unless stated otherwise.
Ventilation	See "General exhaust", "Local exhaust", and "Mechanical ventilation".
Viscosity	The ability of a liquid to resist flow.
Volatility	Refers to the ease with which a material evaporates.
Warning properties	The capability of chemicals to be noticed by human senses at levels in the air below those which may cause ill health effects.
Workplace	"Workplace" means any building, site, workshop, structure, mine, mobile vehicle, or any other premises or location whether indoors or outdoors in which one or more workers, or self-employed persons, are engaged in work or have worked.
Workplace label	A label which discloses: 1. a product identifier which is identical to that found on the material safety data sheet of the corresponding controlled product; 2. information for the safe handling of the controlled product; and 3. that a material safety data sheet, if supplied or produced, is available.

CHAPTER 2

CLASSIFICATION

CONTENTS

Page

2.1 CHAPTER OBJECTIVES 1

2.2 CLASSIFICATION: INTRODUCTION 2

- 2.2.1 PROHIBITED, RESTRICTED AND CONTROLLED PRODUCTS 2
- 2.2.2 CLASSIFICATION, AND THE APPLICATION OF WHMIS INFORMATION REQUIREMENTS 3

2.3 RESPONSIBILITIES FOR CLASSIFICATION 6

- 2.3.1 THE SUPPLIER 6
- 2.3.2 THE EMPLOYER 6
- 2.3.3 THE WORKER 6

2.4 CLASSIFICATION: RULES AND CRITERIA 7

- 2.4.1 CLASSES, DIVISIONS AND SUBDIVISIONS IN WHMIS 7
- 2.4.2 GENERAL RULES FOR CLASSIFICATION 9
- 2.4.3 CLASS A - COMPRESSED GASES 12
- 2.4.4 CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL 15
  1. Division 1: Flammable Gases 15
  2. Division 2: Flammable Liquids 15
  3. Division 3: Combustible Liquids 17
  4. Division 4: Flammable Solids 17
  5. Division 5: Flammable Aerosols 17
  6. Division 6: Reactive Flammable Materials 19
- 2.4.5 CLASS C - OXIDIZING MATERIAL 20
- 2.4.6 CLASS D - POISONOUS AND INFECTIOUS MATERIAL 22
  1. Division 1: Materials Causing Immediate and Serious Toxic Effect 24

Page

2. Division 2: Materials Causing Other Toxic Effects 29

a) Chronic Toxic Effects 31

b) Carcinogenicity 31

c) Reproductive Toxicity 40

d) Teratogenicity and Embryotoxicity 41

e) Mutagenicity 42

f) Sensitization 44

g) Skin or Eye Irritation 45

3. Division 3: Biohazardous Infectious Material 47

2.4.7 CLASS E - CORROSIVE MATERIAL 51

2.4.8 CLASS F - DANGEROUSLY REACTIVE MATERIAL 54

2.5 PRODUCTS EXCLUDED FROM THE APPLICATION OF WHMIS LEGISLATION 56

2.5.1 CONSUMER PRODUCTS 57

2.5.2 EXPLOSIVES 60

2.5.3 COSMETICS, DRUGS, FOODS AND DEVICES 60

2.5.4 PEST CONTROL PRODUCTS 62

2.5.5 RADIOACTIVE PRESCRIBED SUBSTANCES 63

2.5.6 WOOD OR PRODUCTS MADE OF WOOD 63

2.5.7 MANUFACTURED ARTICLES 64

2.5.8 TOBACCO OR PRODUCTS MADE OF TOBACCO 65

2.5.9 HAZARDOUS WASTES 66

2.5.10 PRODUCTS HANDLED OR TRANSPORTED PURSUANT TO THE TRANSPORTATION OF DANGEROUS GOODS (TDG) ACT 67

Page

2.6 COMPARISON OF CLASSIFICATION SYSTEMS - WHMIS AND TDG 70

- 2.6.1 GENERAL COMPARISON OF CLASSIFICATION CATEGORIES 70
- 2.6.2 DETAILED COMPARISON OF CLASSIFICATION CRITERIA 73

APPENDICES

A. CLASSIFICATION WORKSHEETS AND A CASE EXAMPLE OF CLASSIFICATION 78

- A.1 Worksheet for Product Data Collection and Classification 79
- A.2 Product/Ingredient Classification Summary Sheet 90
- A.3 Classification of Hypothetical Product: XYZ Cleaner 93

FIGURES

1 Decision Tree: The Determination of Whether a Product Is Subject to WHMIS Information Requirements 5

2 Classes, Divisions and Subdivisions of Controlled Products 8

3 Decision Tree: Criteria for Inclusion in Class A - Compressed Gases 13

4 Decision Tree: Criteria for Inclusion in Class B - Flammable and Combustible Material 16

5 Applicable Methods for Testing Flashpoints 18

6 Decision Tree: Criteria for Inclusion in Class C - Oxidizing Material 21

7 Decision Tree: Criteria for Inclusion in Divisions 1, 2 or 3 of Class D - Poisonous and Infectious Materials 23

8 Criteria for Assignment of Products to Subdivisions A and B of Division 1 of Class D on the Basis of Acute Toxicity Tests 26

9 Types of Adverse Health Effects Appearing in Subdivisions A and B of Division 2 30

Page

FIGURES (cont'd)

10 Criteria for Assignment of Products to Subdivisions A and B of Division 2 of Class D 32

11 Assignment of Substances as Carcinogens in Threshold Limit Values and Biological Exposure Indices (1987-1988) 34

12 Assignments of Substances and Process as Carcinogenic as Reported in IARC Monographs, Supplement 7, 1988 37

13 Criteria Used to Assign Products to Subdivisions A and B of Division 2 of Class D, Based on Mutagenic Effects 43

14 Criteria for Assigning a Product to Subdivision B on the Basis of Skin or Eye Irritation 46

15 Classification of Infective Microorganisms by Risk Group 49

16 Decision Tree: Criteria for Inclusion in Division 3 of Class D - Biohazardous Infectious Material 50

17 Decision Tree: Criteria for Inclusion in Class E - Corrosive Material 53

18 Decision Tree: Criteria for Inclusion in Class F - Dangerously Reactive Material 55

19 Products in Schedule I, Part II, Which Are Likely to Contain Controlled Products 59

20 Sequence of Application of WHMIS and TDG Information Requirements as Goods Flow Through Commerce 69

21 Classes and Divisions Within WHMIS and TDG - An Overview 71

22 Classes and Divisions Within WHMIS and TDG - A Detailed Summary 77

2.1 CHAPTER OBJECTIVES

Objectives	Location in Chapter
To describe what is meant by classification and its impact on the workplace hazardous materials information system.	2.2
To define three different types of hazardous products: prohibited, restricted and controlled.	2.3
To outline the general logic for determining whether or not a product is a controlled product and the extent to which WHMIS information requirements apply to it.	2.3
To describe the responsibilities of the supplier, employer and worker for the classification of controlled products.	2.4
To discuss the general rules for classification and the details of criteria used for determining whether a product falls into each Class, Division and Subdivision of WHMIS.	2.4
To describe in detail the ten circumstances in which products that may meet criteria for inclusion in WHMIS Classes A-F are not subject to all WHMIS information requirements.	2.5
To compare WHMIS classification criteria with those used for the transportation of dangerous goods.	2.6
To provide examples of worksheets for use when classifying a product and a case example of the classification of a hypothetical chemical mixture.	Appendix A

Chapter 2 makes frequent reference to tests, classification lists and guidelines available from various agencies. Detailed information on reference sources is provided in Chapter 7, "Resources".

2.2 CLASSIFICATION: INTRODUCTION

2.2.1 PROHIBITED, RESTRICTED AND CONTROLLED PRODUCTS

The Hazardous Products Act (HPA) and pursuant regulations deal with three types of hazardous products termed prohibited, restricted and controlled. WHMIS applies to controlled products.

A **prohibited product** is any product, material or substance which is listed in Part I of Schedule I of HPA. Many prohibited products are toys, equipment or clothing which pose a hazard to children. Some contain substances which would be hazardous to workers if used in the workplace; for example: dry-wall cements, spackling or patching compounds that contain asbestos, textile fibre products that are to be worn and that contain asbestos fibres (other than products designed for protection against fire or heat hazards and constructed so that the fibres will not become separated from the product in any reasonably foreseeable use), liquid coatings and paint and varnish removers with a flashpoint less than 0°F and aerosol containers with any amount of vinyl chloride. Prohibited products may not be advertised, sold or imported into Canada.

A **restricted product** is any product, material or substance included in Part II of Schedule I of HPA. Restricted products include a variety of consumer goods; for example, various children's articles, food product containers and some hazardous substances which are packaged for consumer use such as bleaches, cleansers, corrosives, petroleum distillates and adhesives. Restricted products may not be imported, advertised or sold contrary to the requirements of the *Consumer Chemicals and Containers Regulations* (formerly known as the Hazardous Products [Hazardous Substances] Regulations).

A **controlled product** is any product, material or substance which, by application of criteria in Part IV of the *Controlled Products Regulations*, is included in any of the six classes:

A. Compressed Gas

B. Flammable and Combustible Material

C. Oxidizing Material

D. Poisonous and Infectious Material

E. Corrosive Material

F. Dangerously Reactive Material

Controlled products include a wide range of chemical substances, mixtures and products found in the workplace, as well as various biohazardous infectious materials.

2.2.2 CLASSIFICATION, AND THE APPLICATION OF WHMIS INFORMATION REQUIREMENTS

Classification is the determination of whether a product meets the criteria for inclusion in any of the WHMIS Classes and is subject to WHMIS information requirements. Classification affects not only the inclusion of a product within WHMIS but also the:

- **content of labels, particularly hazard symbols, risk statements and precautionary measures;**
- **content of material safety data sheets; and**
- **instruction provided to workers.**

In short, classification is the foundation to WHMIS.

Not all controlled products are covered equally by WHMIS information requirements. Some, depending on their *use* (e.g. cosmetics or pesticides), *character* (e.g. wood or products made of wood) or *position in commerce* (e.g. goods in transport, wastes), are exempt from portions or all of WHMIS requirements.

In brief:

- The Hazardous Products Act and *Controlled Products Regulations*, which are concerned with the supply of controlled products to the workplace, do not require suppliers to provide WHMIS labels and material safety data sheets for the following types of products.*

  1. a restricted product when packaged as a consumer product;
  2. explosives within the meaning of the Explosives Act;
  3. a cosmetic, drug, food or device within the meaning of the Food and Drugs Act;
  4. a pest control product within the meaning of the Pest Control Products Act;
  5. a prescribed substance within the meaning of the Atomic Energy Control Act;
  6. wood or products made of wood;

---

* Section 57 of Bill C-70, the federal legislation enabling the establishment of WHMIS, requires that the matter of excluded products be referred to a committee of Parliament for review within two years of enactment of Section 12 of the Hazardous Products Act. (Bill C-70 has been incorporated into Chapter 30, 1987, of the Statutes of Canada.)

7. a manufactured article;

8. tobacco or products made of tobacco;

9. hazardous wastes.

   In addition, products being handled, offered for transport or transported, subject to the requirements of the Transportation of Dangerous Goods Act, are not subject to WHMIS information requirements. In many circumstances, WHMIS labels and other information will be provided with such shipments but WHMIS requirements formally apply only at points of sale and workplace receipt of controlled products.

- The Workplace Hazardous Materials Information System Regulations (Model OSH Regulations), which provide WHMIS requirements for the storage, handling, use and disposal of products in the workplace and the education of workers, have restricted application to these types of products as follows:

    - Products in categories #1-5 are subject to all Model OSH Regulations except those related to material safety data sheets and supplier labels.

    - None of the Model OSH requirements apply to products in categories #6-8 nor to products being transported or handled pursuant to the requirements of the TDG Act.

    - For hazardous wastes generated at the workplace (category #9), the employer must, under Model OSH, ensure safe storage and handling through a combination of any mode of identification and worker education.

  The decision tree in Figure 1 summarizes the logic for determining the application of WHMIS information requirements to controlled products.

NOTE: It is essential to understand that WHMIS is only one area of right-to-know legislation. Some requirements for information on products in categories #1-5 are contained in separate legislation concerning those products. In addition, safety and health regulatory agencies typically have generic right-to-know legislation other than WHMIS which requires provision of information on products which could be harmful to workers. All forms of legislation must be complied with.

The next three Parts of this Chapter (2.3, 2.4, 2.5) deal with:

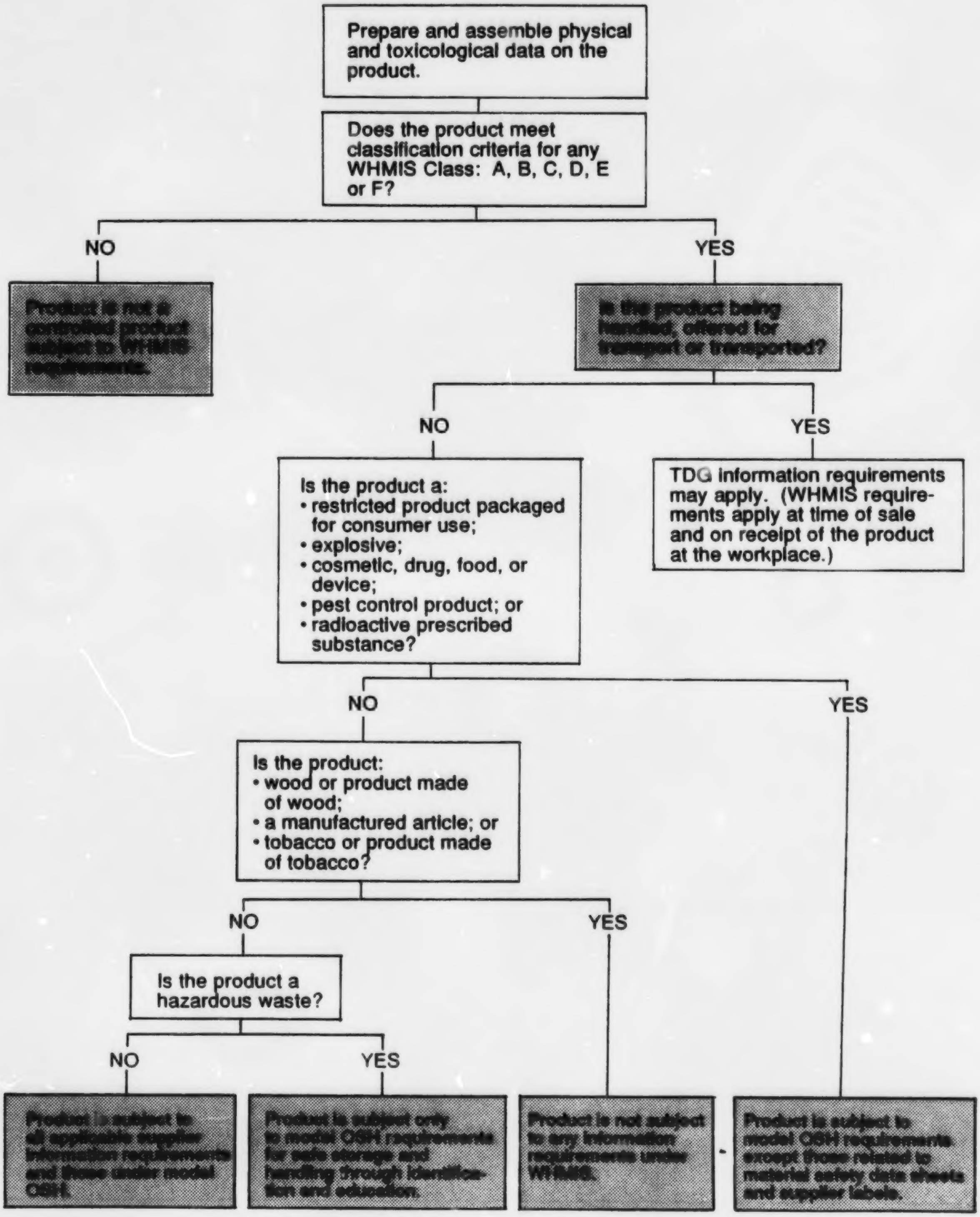
- the responsibilities of suppliers, employers and workers for the classification of products;

- rules and criteria for classification of products within the Classes, Divisions and Subdivisions of WHMIS;

- the determination of what products are excluded (in whole or part) from the application of WHMIS requirements.

FIGURE 1

DECISION TREE: THE DETERMINATION OF WHETHER A PRODUCT IS SUBJECT TO WHMIS INFORMATION REQUIREMENTS


Prepare and assemble physical and toxicological data on the product.
Does the product meet classification criteria for any WHMIS Class: A, B, C, D, E or F?
NO
YES
Product is not a controlled product subject to WHMIS requirements.
Is the product being handled, offered for transport or transported?
NO
YES
Is the product a:
• restricted product packaged for consumer use;
• explosive;
• cosmetic, drug, food, or device;
• pest control product; or
• radioactive prescribed substance?
TDG information requirements may apply. (WHMIS requirements apply at time of sale and on receipt of the product at the workplace.)
NO
YES
Is the product:
• wood or product made of wood;
• a manufactured article; or
• tobacco or product made of tobacco?
NO
YES
Is the product a hazardous waste?
NO
YES
Product is subject to all applicable supplier information requirements and those under model OSH.
Product is subject only to model OSH requirements for safe storage and handling through identification and education.
Product is not subject to any information requirements under WHMIS.
Product is subject to model OSH requirements except those related to material safety data sheets and supplier labels.

2.3 RESPONSIBILITIES FOR CLASSIFICATION

2.3.1 THE SUPPLIER

1. The supplier has the fundamental responsibility for the classification of controlled products imported into or sold in Canada.

2. To determine whether a product is included in any class, the supplier must use results from tests and criteria in accordance with the requirements of the *Controlled Products Regulations*. The supplier must either carry out testing or obtain information based on evaluation and scientific judgement of test results carried out by others on the product or, where appropriate, on a product that has similar properties.

3. To determine whether a product is included in Class D, Poisonous and Infectious Material, the supplier has the option of basing the classification on test data or on other information of which the supplier is aware or ought reasonably to be aware.

2.3.2 THE EMPLOYER

1. The employer has the fundamental responsibility for the classification of products produced in the workplace. The tests and criteria for assigning products to classes are the same as for the supplier.

2. Where the employer imports a product directly into the workplace from a source outside Canada for use in the employer's workplace, the employer is considered the "supplier" to that workplace and has the classification responsibilities of the supplier.

2.3.3 THE WORKER

While the worker does not have specific responsibilities for the classification of controlled products under WHMIS, if he or she has information that a product in the workplace is not properly classified, that information should be brought to the attention of the employer. In many jurisdictions, workers have a responsibility under non-WHMIS regulations to report unsafe conditions. Improper classification of a controlled product is considered unsafe.

2.4 CLASSIFICATION: RULES AND CRITERIA

This section provides information on classification as follows:

2.4.1	an overview of the Classes, Divisions and Subdivisions in WHMIS;
2.4.2	a review of general rules for classification; and
2.4.3-2.4.8	a detailed review of classification criteria for assigning a product to each WHMIS Class, A-F, and to Divisions and Subdivisions within them. Decision trees are provided for each Class.

2.4.1 CLASSES, DIVISIONS AND SUBDIVISIONS IN WHMIS

A product is a controlled product if it meets any criterion for inclusion in one of the six classes shown in Figure 2. Two of the classes, CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL and CLASS D - POISONOUS AND INFECTIOUS MATERIAL, are divided into various divisions and subdivisions.

Divisions within Class B are determined primarily on the basis of the phase and form of the material, its degree of flammability and whether or not the product reacts with air or water in a manner that increases the flammability hazard.

Divisions and subdivisions within Class D are established on the basis of whether the product is a live microorganism or not, whether it causes immediate and serious toxic effects, or other effects such as chronic effects, and on the degree of toxic effect.

FIGURE 2

CLASSES, DIVISIONS AND SUBDIVISIONS OF CONTROLLED PRODUCTS

Class/Division/Subdivision	Description
CLASS A	COMPRESSED GAS
CLASS B	FLAMMABLE AND COMBUSTIBLE MATERIAL
Division 1	Flammable Gases
Division 2	Flammable Liquids
Division 3	Combustible Liquids
Division 4	Flammable Solids
Division 5	Flammable Aerosols
Division 6	Reactive Flammable Materials
CLASS C	OXIDIZING MATERIAL
CLASS D	POISONOUS AND INFECTIOUS MATERIAL
Division 1	Material Causing Immediate and Serious Toxic Effects
• Subdivision A	• Very Toxic Material
• Subdivision B	• Toxic Material
Division 2	Materials Causing Other Toxic Effects
• Subdivision A	• Very Toxic Material
• Subdivision B	• Toxic Material
Division 3	Biohazardous Infectious Material
CLASS E	CORROSIVE MATERIAL
CLASS F	DANGEROUSLY REACTIVE MATERIAL

2.4.2 GENERAL RULES FOR CLASSIFICATION

(Reference: CPR, Section (33)

Part VI of the Controlled Products Regulations (CPR) provides the criteria for determining if a product is included in any of the six classes of WHMIS.

There are six kinds of criteria provided in Part IV:

- Tests on the whole product - for example, the various OECD tests for poisonous effects found in Class D.
- Tests on ingredients in a product - as found in criteria for Classes D and E.
- Basic Physical or Chemical Data - for example, the use of critical temperature and vapour pressure in Class A, or flashpoints in Class B.
- Comparison with Classification Lists - for example, the use of IARC and ACGIH lists in Class D for determination of cancer risk.
- Comparison with Other Regulations - for example, comparison with TDG classification in Classes B, D and E.
- General Scientific Evidence - for example, evidence in humans that a product causes sterility (Class D) or necrosis of the skin (Class E).

Most of the criteria involve tests. There are five general rules to use when applying any of the criteria found in Part IV. Rules 1 and 2 apply to criteria for all 6 classes, rules 3 and 4 apply to Class D only, and rule 5 is a warning not to use the Ingredient Disclosure List for purposes of classification. The basis for these rules is found primarily in Section 33 of the CPR.

Rule 1: To determine whether or not a product is a controlled product, apply each and every of the criteria for inclusion in the six WHMIS classes as prescribed in Part (IV) of the Controlled Products Regulations (CPR).

Some products will meet the criteria for more than one classification category. For example, benzene is not only a Flammable Liquid (Class B, Division 2) but it also is considered a Poisonous Material (Class D, Division 2, Subdivision A) because it is listed by IARC and ACGIH as a carcinogen.

Rule 2: To determine whether a product, material or substance is included in a class the supplier must use either:

a) **results from testing carried out by the supplier on the product, material or substance where specified in Sections 34 to 66 of the CPR; or**

b) **evaluation and scientific judgement based on test results on either the product, material or substance, or, where appropriate, on a product material or substance with similar properties.**

Rule 2(a) means that a supplier may test a product according to test methods, where specified in criteria, and use the results to determine if the product meets or does not meet the criteria.

For example, a supplier may use tests carried out in accordance with appropriate OECD Test Guidelines for the purposes of classifying a product in Class D for reasons of acute lethality, chronic toxic effect, teratogenicity and embryotoxicity, reproductive toxicity, mutagenicity, skin and eye irritation or sensitization.

Rule 2(b) enables a supplier to judge whether a product meets a criterion for inclusion without actually testing the product - but on one condition: the supplier must make an assessment using scientific judgement based on test results available on the product or, where relevant, test results available on a product with similar properties.

Scientific judgement exercised by a person means making a decision as a result of logically considering all available scientific facts applicable to the matter under consideration in light of the person's scientific knowledge and experience pertaining to it.

Where scientific judgement is based on products with similar properties, it is one thing to estimate a simple paramater such as flashpoint for a hydrocarbon mixture from two other hydrocarbon mixtures, one slightly heavier and one slightly lighter than the product in question; it is another thing to assume that more complex information such as toxicological properties of one product are similar to other closely related products. For example, exposure to benzene can cause leukemia; exposure to the two closely related products, toluene and xylene, does not.

Rule 3: **If, for the purposes of classifying a product in Class D, toxicological testing of a product has not been carried out according to OECD Test Guidelines referred to in the criteria for Class D, then test data used for evaluation and scientific judgement must be based on tests or methods carried out in accordance with generally accepted standards of good scientific practice at the time the test was carried out.**

Rule 3 allows the supplier to use the wealth of toxicological information derived; for example, from testing carried out prior to the establishment of OECD Guidelines. Subsections 33(3)(b) (i)-(iv) of CPR give examples of tests or methods that are considered to meet acceptable standards of good scientific practice when they were first published; i.e.:

- in the case of a 90-day test or a chronic test, a test or method described in US Food and Drug Administration (FDA) guidelines or US Environmental Protection Agency (EPA) guidelines, as published in the **Federal Register** and as amended from time to time,
- in the case of a test for skin or eye irritation, the Draize Test as described in volume 82 of the **Journal of Pharmacology and Experimental Therapeutics**, dated 1944, at pages 377 to 390,
- in the case of a test for teratogenicity, a test or method described in **Principles for the Testing of Drugs for Teratogenicity**, Technical Report Series Number 364, published in 1967 by the World Health Organization, or
- in the case of a test for mutagenicity, a test or method described by the US Environmental Protection Agency (EPA) in "Proposed Guidelines for Registering Pesticides in the US; Hazard Evaluation: Human and Domestic Animals", as published in volume 43 of the **Federal Register** (No. 163), dated 1978, at pages 37, 336 to 37, 403.

Rule 4: For the purposes of classifying a product in Class D the supplier has the option of basing the classification on test data or on other information of which the supplier is aware or ought reasonably to be aware.

This rule means that a supplier will not have to undertake testing of a product if there is no toxicological data available. However, the supplier ought to be aware of relevant information from published technical literature, from the Canadian Centre for Occupational Health and Safety and from the publications of regulatory agencies, industry or trade associations and labour organizations that are related to occupational health and safety. Chapter 7 of this Manual provides addresses and telephone numbers for various agencies as well as a list of literature sources.

Rule 5: The Ingredient Disclosure List which accompanies the CPR is not the basis for classification.

The purpose of the IDL is solely as one means of determining which substances must be identified in the Hazardous Ingredients Section of the Material Safety Data Sheet for a product that has already been classified as a controlled product. The basis for classification is the application of the rules and criteria provided in Part IV of the Controlled Products Regulations. (See Chapter 4 of this Manual for a discussion of Data Sheets and a copy of the IDL).

2.4.3 CLASS A - COMPRESSED GASES (Reference: CPR - Section 34)

A product, material or substance is included in Class A if it is contained under pressure and meets any one of four additional criteria:

1. **It exhibits a critical temperature of less than 50°C (122°F).** For example, a pressurized container of carbon dioxide, which has a Tc of 31°C, is a controlled product, whereas a similar container of sulphur dioxide, which has a Tc of 157.8°C, is not.

2. **It has an absolute vapour pressure greater than 294 kilopascals (2.9 atmospheres) at 50°C (122°F).** For example, a pressurized container of butane, which has a vapour pressure of 5 atmospheres at 50°C, is a controlled product.

3. **It has an absolute pressure in the cylinder or other pressure vessel in which it is packaged greater than 275 ± 1 kilopascals (2.71 ± 0.01 atmospheres) at 21.1°C (70°F) or 717 ± 2 kilopascals (7.07 ± 0.02 atmospheres) at 54.4°C (130°F).**

4. **In a liquid state, it has an absolute vapour pressure exceeding 275 kilopascals (2.71 atmospheres) at 37.8°C (100°F) as determined by the Standard Test Method for Vapour Pressure of Petroleum Products (Reid Method), ASTM D323-82, dated August 27, 1981.**

Class A includes compressed gases, dissolved gases or gases liquefied by compression or refrigeration. Figure 3 provides a summary of the decision sequence used when applying criteria for inclusion in Class A. Technical terms used with these criteria have the following meanings:

- **Critical temperature (Tc)** is the temperature above which a gas cannot be converted to a liquid by pressure. A substance can exist only as a gas above the Tc.

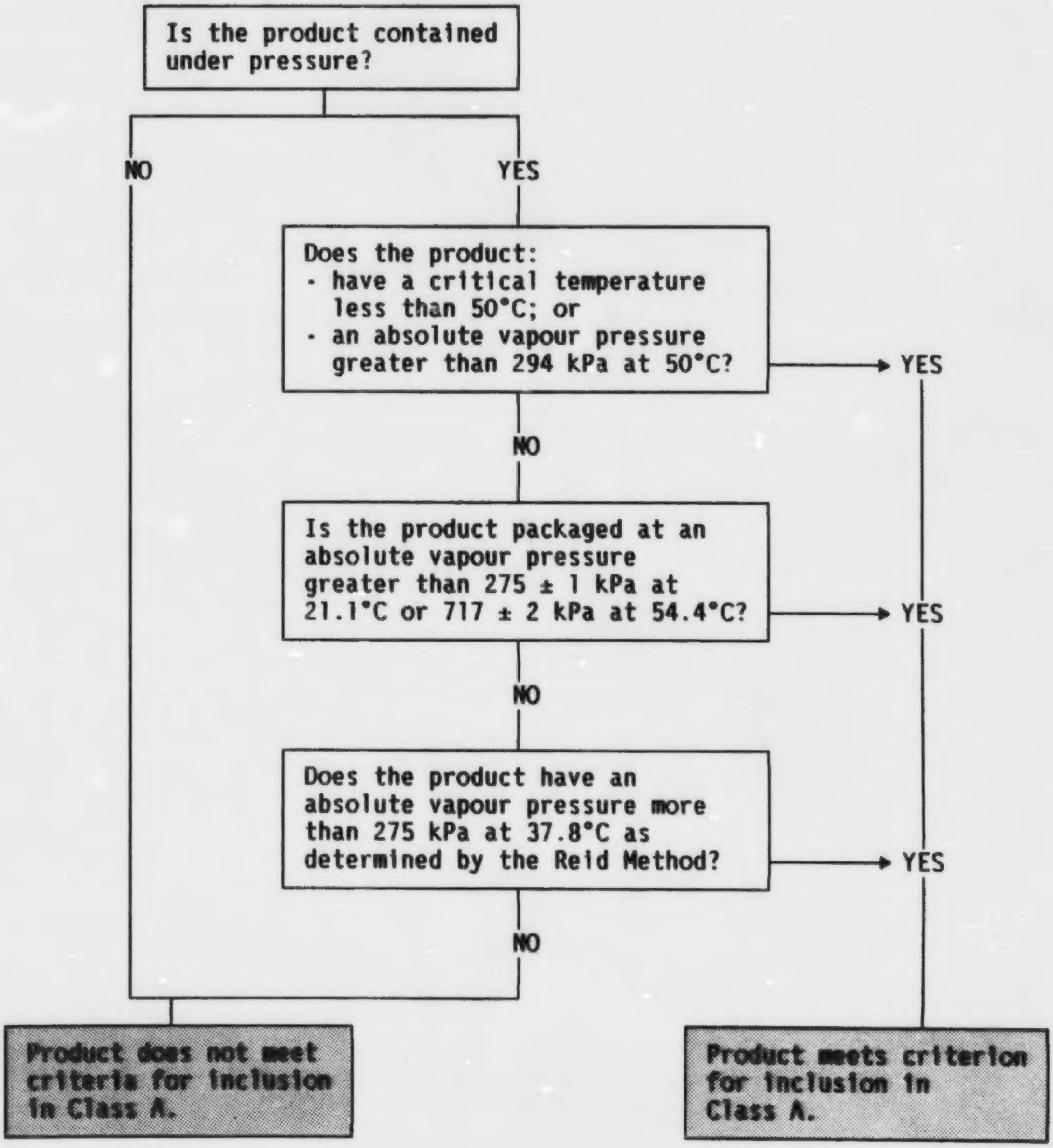
- **Vapour pressure** is the pressure exerted by a vapour of a substance when it is in equilibrium with its liquid or solid form. The vapour pressure of a substance increases with temperature until the critical temperature is reached, beyond which the concept is meaningless because the substance cannot exist as a solid or liquid.

- **Cylinder pressure** is the pressure to which a cylinder is filled.

FIGURE 3

DECISION TREE: CRITERIA FOR INCLUSION IN CLASS A - COMPRESSED GASES

(Reference: CPR, Section 34)


Is the product contained under pressure?
NO
YES
Does the product:
· have a critical temperature less than 50°C; or
· an absolute vapour pressure greater than 294 kPa at 50°C?
YES
NO
Is the product packaged at an absolute vapour pressure greater than 275 ± 1 kPa at 21.1°C or 717 ± 2 kPa at 54.4°C?
YES
NO
Does the product have an absolute vapour pressure more than 275 kPa at 37.8°C as determined by the Reid Method?
YES
NO
Product does not meet criteria for inclusion in Class A.
Product meets criterion for inclusion in Class A.

- **Absolute pressure** is pressure measured with respect to zero pressure (i.e. measured in a vacuum), in contrast to gauge pressure which is measured with respect to atmospheric pressure. Absolute pressure = atmospheric pressure + gauge pressure. Absolute vapour pressure and absolute pressure in a cylinder merely refer to vapour and cylinder pressure measured with respect to zero rather than gauge.

- **Pressure conversions** of use when applying the criteria are: 1 atmosphere = 101.3 kilopascals = 760 millimetres of mercury = 760 torr = 14.7 pounds per square inch.

- **The Reid Method** is used for the determination of vapour pressure for gasoline, crude oil and volatile petroleum products. It does not apply to oxygenated fuels.

2.4.4 CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL

Six divisions are prescribed within this class: Flammable Gases, Flammable, Liquids, Combustible Liquids, Combustible Solids, Flammable Aerosols, and Reactive Flammable Materials. Criteria are described in Sections 35-41 of CPR. Figure 4 provides a summary of the decision sequence used when applying criteria for inclusion in Class B.

1. Division 1: Flammable Gases (Reference: CPR, Section 36)

A product, material or substance falls into this division if it is a Compressed Gas (Class A) and at normal atmospheric pressure forms a flammable mixture with air:

a) **when in a concentration of 13 per cent or less by volume, or**

b) **over a concentration range of at least 12 per cent by volume.**

NOTE:

- **Normal atmospheric pressure means an absolute pressure of 101.325 kilopascals (1.00 atmosphere) at 20°C (68°F).**
- **Flammable limits are determined in air, not oxygen.**

A cylinder of butane is considered a Flammable Gas because its lower flammable limit in air is 1.9%, although its flammable range is only 6.5%. Hydrogen is a flammable gas both in terms of its lower flammable limit (4%) and its flammable range (70%).

2. Division 2: Flammable Liquids
(Reference: CPR, Section 37 and Schedule IV)

A product, material or substance falls into Division 2 if it has a flashpoint less than 37.8°C (100°F) when tested in accordance with the applicable method. The flashpoint of a liquid is the minimum temperature at which vapour from the liquid will ignite in the presence of a source of ignition.

The test method to apply to a liquid depends on the use of the liquid and its viscosity* (see Figure 5). All the flashpoint methods adopted under the *Controlled Products Regulations*

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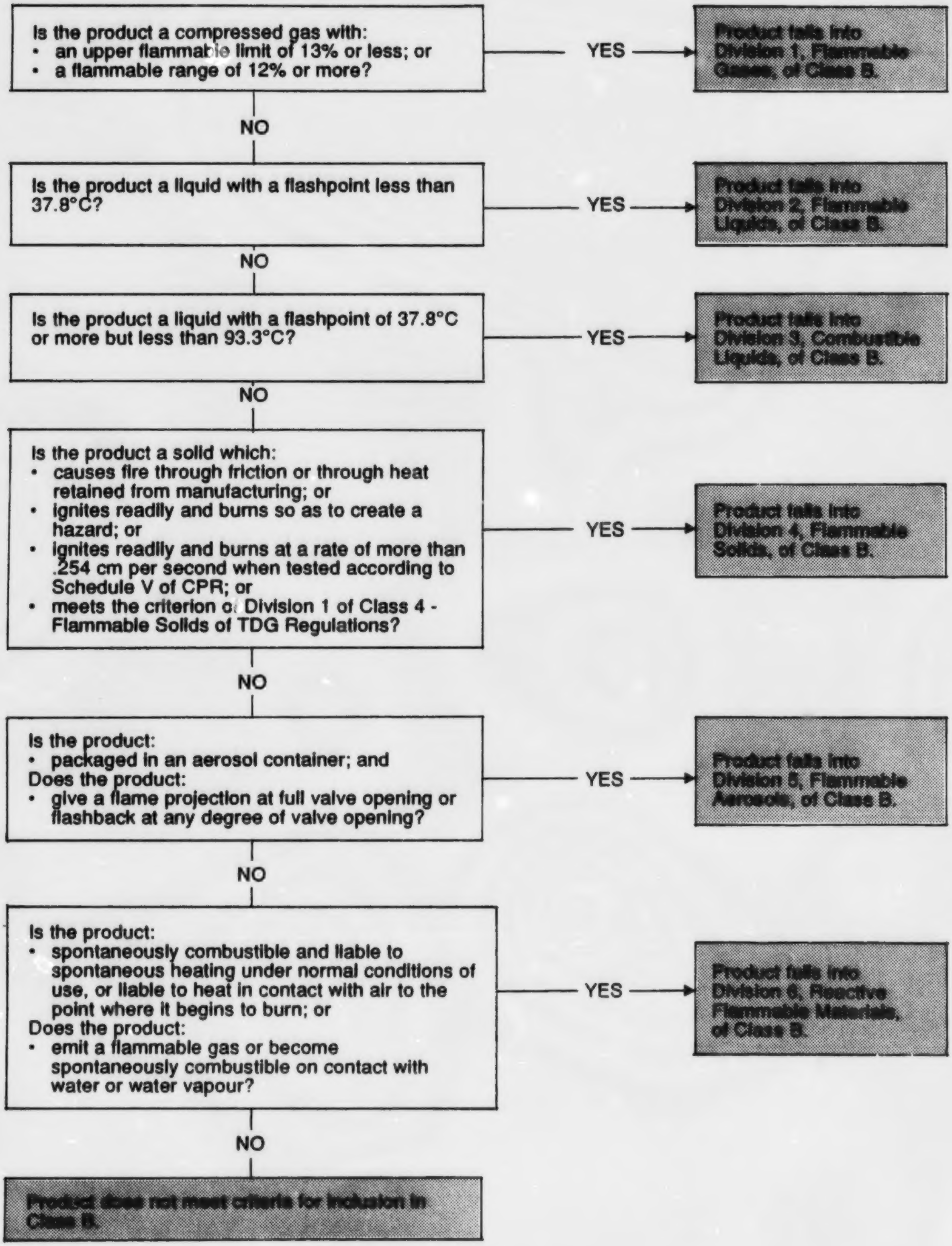
* Viscosity is the ability of a fluid to resist flow and can be measured in various ways. Dynamic viscosity, the ratio of the viscosity of a fluid to its density, is reported in units such as millimetres^2/second and Saybolt Universal Seconds (1 mm^2/s = 7.76 SUS).

FIGURE 4

DECISION TREE: CRITERIA FOR INCLUSION IN CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL

(Reference: CPR, Sections 35-41)



Is the product a compressed gas with:
- an upper flammable limit of 13% or less; or
- a flammable range of 12% or more?

Product falls into Division 1, Flammable Gases, of Class B.

Is the product a liquid with a flashpoint less than 37.8°C?

Product falls into Division 2, Flammable Liquids, of Class B.

Is the product a liquid with a flashpoint of 37.8°C or more but less than 93.3°C?

Product falls into Division 3, Combustible Liquids, of Class B.

Is the product a solid which:
- causes fire through friction or through heat retained from manufacturing; or
- ignites readily and burns so as to create a hazard; or
- ignites readily and burns at a rate of more than .254 cm per second when tested according to Schedule V of CPR; or
- meets the criterion of Division 1 of Class 4 - Flammable Solids of TDG Regulations?

Product falls into Division 4, Flammable Solids, of Class B.

Is the product:
- packaged in an aerosol container; and

Does the product:
- give a flame projection at full valve opening or flashback at any degree of valve opening?

Product falls into Division 5, Flammable Aerosols, of Class B.

Is the product:
- spontaneously combustible and liable to spontaneous heating under normal conditions of use, or liable to heat in contact with air to the point where it begins to burn; or

Does the product:
- emit a flammable gas or become spontaneously combustible on contact with water or water vapour?

Product falls into Division 6, Reactive Flammable Materials, of Class B.

Product does not meet criteria for inclusion in Class B.

are closed cup, meaning the vapour is enclosed above the liquid. (Open cup methods, which do not provide such enclosure, tend to yield flashpoints which are higher than when measured by closed-cup technique.)

Benzene and gasoline are examples of flammable liquids.

3. Division 3: Combustible Liquids
(Reference: CPR, Section 38 and Schedule IV)

A product, material or substance falls into Division 3 if it has a flashpoint of 37.8°C (100°F) or more but less than 93.3°C (200°F) when tested in accordance with the applicable method shown in Figure 5. Kerosene is an example of a combustible liquid.

4. Division 4: Flammable Solids
(Reference: CPR, Section 39 and Schedule V)

A product, material or substance is included in this division if it meets any one of four criteria:

a) **It causes fire through friction or through retained heat from manufacturing or processing.** (Example: white phosphorus)

b) **It can be ignited readily and when ignited burns so vigorously and persistently as to create a hazard.** (Examples: various magnesium alloys and the pharmaceutical agent hexamine)

c) **It ignites readily and burns with a self-sustained flame at a rate of more than 0.254 centimetre (0.1 inch) per second along its major axis, when tested in accordance with the method set out in Schedule V of CPR.** (The method involves a simple measurement of rate of burn of substances along the horizontal axis.)

d) **It meets the criterion for flammable solids (Division 1 of Class 4) of the Transportation of Dangerous Goods Regulations.** Schedule II to TDG Regulations provides a list of Class and Division assignments for more than 3,000 substances. (Beryllium, hafnium powder and zirconium are examples of substances on the list which are assigned to Division 1, Class 4.)

5. Division 5: Flammable Aerosols
(Reference: CPR, Section 40 and Schedule VI)

Any product, material or substance is included in Division 5 if it is packaged in an aerosol container and, when tested in accordance with the method set out in

FIGURE 5

APPLICABLE METHODS FOR TESTING FLASHPOINTS (From Schedule IV of Controlled Products Regulations)

Type of Fluid	Method of Testing for Flashpoint
1. Aviation turbine fuel	The appropriate test in Standard Test Methods for Flash Point by Setaflash Closed Tester, ASTM D3828-81, dated August 28, 1981
2. Paint, enamel, lacquer, varnish or similar liquid that has a flashpoint between 0°C (32°F) and 110°C (230°F), and a viscosity of less than 15,000 mm^2/s at 25°C (77°F) determined in accordance with the Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity), ASTM D445-83, dated October 28, 1983	The appropriate test in Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus, ASTM D3278-82, dated August 28, 1981
3. A liquid, other than (1) or (2), having a viscosity of less than 5.8 mm^2/s (45 Saybolt Universal Seconds) at 37.8°C (100°F)	Standard Test Method for Flash Point by Tag Closed Tester (ASTM D56-82, dated August 27, 1982, or the appropriate test in the Standard Test Methods for Flash Point by Setaflash Closed Tester, ASTM D3828-81, dated August 28, 1981
4. A liquid other than (1) or (2), having a viscosity of 5.8 mm^2/s (45 Saybolt Universal Seconds) or more at 37.8°C (100°F)	Standard Test Methods for Flash Point by Pensky-Martens Closed Tester, ASTM D93-80, dated August 29, 1980

Schedule VI of the *Controlled Products Regulations*, produces a flame projection or a flashback. Ignition may be due either to the flammability of the aerosol itself or the propellant. Examples of flammable propellants are propane, butane, isobutane, and dimethyl ether.

Schedule VI to the CPR, called the Test for Determining the Flashback and the Length of Flame Projection, describes the test apparatus and protocol.

Under test conditions, **flame projection** is any visible ignition of the aerosol stream at full valve opening; **flashback**, that part of flame projection that extends from the burner back to the aerosol container at any degree of valve opening. An aerosol product with any length of flame projection or flashback meets WHMIS criteria for inclusion as a controlled product.*

6. Division 6: Reactive Flammable Materials
(Reference: CPR, Section 41)

A product, material or substance falls into Division 6 of Class B if it meets either of two conditions:

a) **It is spontaneously combustible and liable to spontaneous heating under normal conditions of use or liable to heat in contact with air to the point where it begins to burn.** (Example: aluminum alkyl compounds)

b) **It emits a flammable gas or becomes spontaneously combustible on contact with water or water vapour.** (Examples: metallic sodium, lithium amide and lithium aluminum hydride)

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* Schedule VI describes in detail the use of frame-mounted cheesecloth set 15 and 45 cm from the point of ignition. The use of cheesecloth is not necessary for the purposes of WHMIS classification. Cheesecloth assists with the determination of length of flame projection when required for the evaluation of aerosols sold as restricted products pursuant to the Hazardous Products (Hazardous Substances) Regulations. Length of flame projection affects the hazard rating and signal words for such products -- i.e. "Danger" if 45 cm or more, "Warning" if 15 cm to 45 cm and "Caution" if less than 15 cm. **Classification of a product for the purposes of WHMIS does not require determination of length of flame projection, only its presence or not.**

2.4.5 CLASS C - OXIDIZING MATERIAL (Reference: CPR, Section 42)

A product, material or substance is a controlled product within the meaning of Class C if it meets either of two conditions:

1. **It causes or contributes to the combustion of another material by yielding oxygen or any other oxidizing substance, whether or not the product is itself combustible.** (Examples: nitrates, nitrites, bromates, chlorates, dichromates, hypochlorites, perchlorates, permanganates, inorganic peroxides and various inorganic peroxo compounds such as peroxonitrates and peroxosulphates)

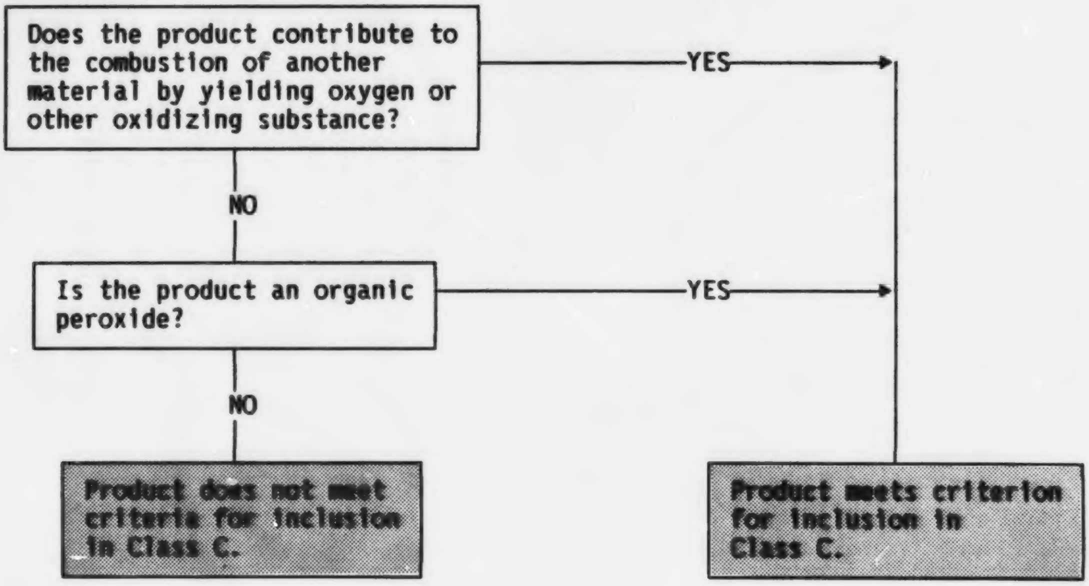
2. **It is an organic peroxide that contains the bivalent O-O structure.** (Examples: benzoyl peroxide, various organic peroxy esters, and organic hydroperoxides)

Figure 6 provides a summary of the decision sequence used when applying criteria for inclusion in Class C.

FIGURE 6

DECISION TREE: CRITERIA FOR INCLUSION IN CLASS C - OXIDIZING MATERIAL

(Reference: CPR, Section 42)


Does the product contribute to the combustion of another material by yielding oxygen or other oxidizing substance?
YES
NO
Is the product an organic peroxide?
YES
NO
Product does not meet criteria for inclusion in Class C.
Product meets criterion for inclusion in Class C.

2.4.6 CLASS D - POISONOUS AND INFECTIOUS MATERIAL

This is one of the most comprehensive classes in WHMIS. The criteria for inclusion (see CPR, Sections 33, 43-64) cover a broad range of adverse effects from acute lethality to mutagenicity or cancer.

Criteria are grouped within three Divisions.

Division 1: Materials Causing Immediate and Serious Toxic Effects: Criteria deal primarily with the capability of products, substances and materials to cause acute lethal effects; that is, death to test animals in short-term tests. Two Subdivisions, A: Very Toxic Material and B: Toxic Material, are provided.

Division 2: Materials Causing Other Toxic Effects: Criteria deal with effects other than those which are immediate and serious; for example, skin and eye irritation and long-term effects in persons or animals, such as chronic toxic effects, mutagenicity, sensitization and cancer. Two Subdivisions, A: Very Toxic Material and B: Toxic Material are provided to indicate the degree of concern. Assignment to subdivisions depends on both the capability of the product to cause an adverse effect and the type of effect.

Division 3: Biohazardous Infectious Material: This Division applies to organisms such as viruses, bacteria, rickettsia, fungi, protozoa and helminths which cause disease or are reasonably believed to cause disease in persons or animals, and to the toxins produced by such organisms. No Subdivisions are provided for Division 3.

The criteria for determining whether or not a product falls into Class D are different than criteria for most other classes in two ways:

- Information used for classification may be based not only on tests or evaluation and scientific judgement based on test results, but also on any other information of which the supplier is aware or ought reasonably to be aware.

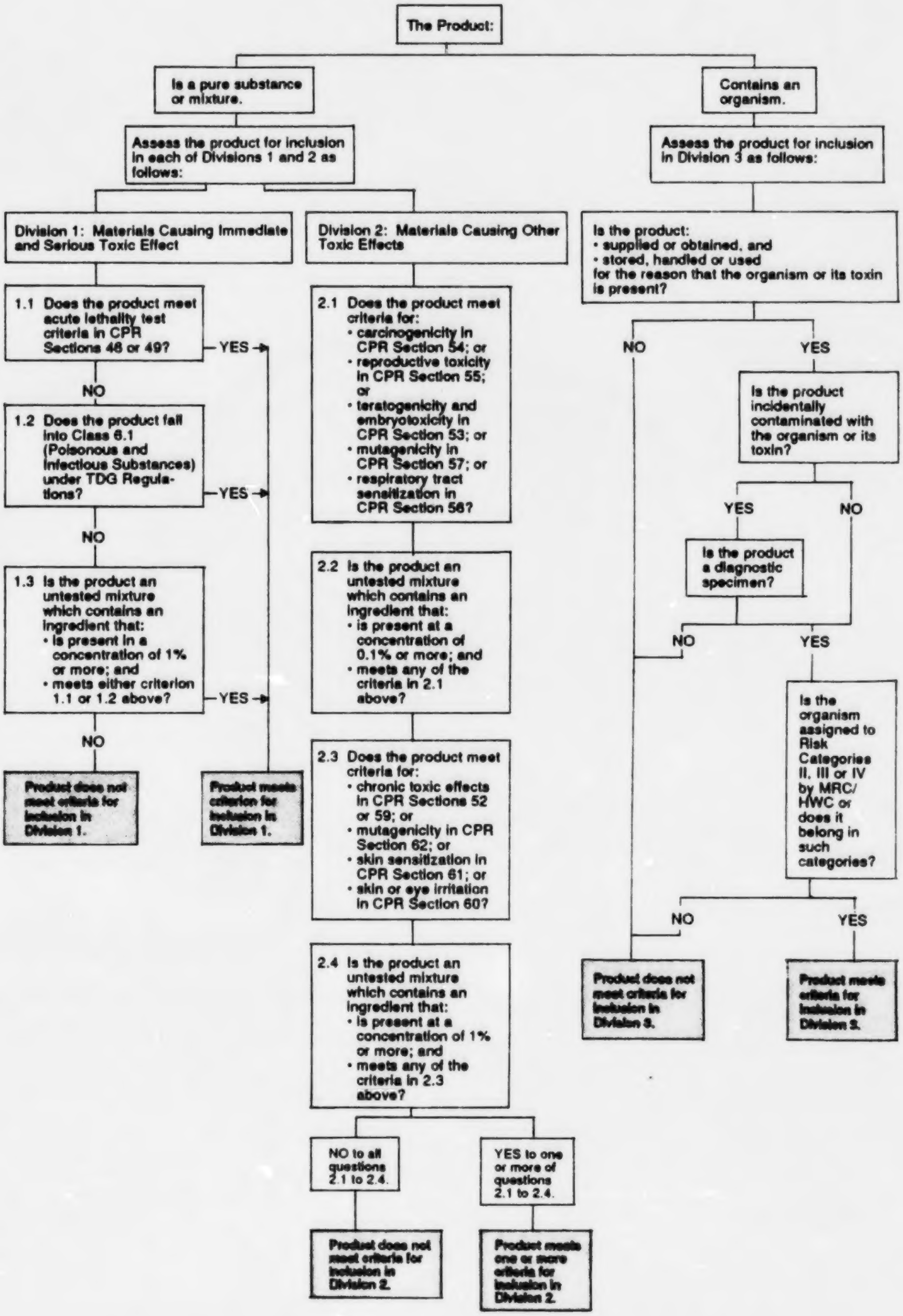
- Where an untested mixture contains a tested ingredient which meets any criterion for inclusion in Division 1 or Division 2 of Class D and the ingredient is present in excess of percentages specified in CPR then the entire untested mixture is assigned the classification of the tested ingredient. Specified percentages are one per cent for Division 1 and either one per cent or 0.1 per cent, depending on the nature of toxic effect, for Division 2.

Figure 7 provides a summary of the decision sequence used when applying criteria for inclusion in each of the three Divisions of Class D.

FIGURE 7

DECISION TREE: CRITERIA FOR INCLUSION IN DIVISIONS 1, 2 OR 3 OF CLASS D - POISONOUS AND INFECTIOUS MATERIALS

(Reference: CPR, Sections 33, 43-64)


The Product:
Is a pure substance or mixture.
Contains an organism.
Assess the product for inclusion in each of Divisions 1 and 2 as follows:
Assess the product for inclusion in Division 3 as follows:
Division 1: Materials Causing Immediate and Serious Toxic Effect
Division 2: Materials Causing Other Toxic Effects
1.1 Does the product meet acute lethality test criteria in CPR Sections 46 or 49?
YES
NO
1.2 Does the product fall into Class 6.1 (Poisonous and Infectious Substances) under TDG Regulations?
YES
NO
1.3 Is the product an untested mixture which contains an ingredient that: • is present in a concentration of 1% or more; and • meets either criterion 1.1 or 1.2 above?
YES
NO
Product does not meet criteria for inclusion in Division 1.
Product meets criterion for inclusion in Division 1.
2.1 Does the product meet criteria for: • carcinogenicity in CPR Section 54; or • reproductive toxicity in CPR Section 55; or • teratogenicity and embryotoxicity in CPR Section 53; or • mutagenicity in CPR Section 57; or • respiratory tract sensitization in CPR Section 56?
2.2 Is the product an untested mixture which contains an ingredient that: • is present at a concentration of 0.1% or more; and • meets any of the criteria in 2.1 above?
2.3 Does the product meet criteria for: • chronic toxic effects in CPR Sections 52 or 59; or • mutagenicity in CPR Section 62; or • skin sensitization in CPR Section 61; or • skin or eye irritation in CPR Section 60?
2.4 Is the product an untested mixture which contains an ingredient that: • is present at a concentration of 1% or more; and • meets any of the criteria in 2.3 above?
NO to all questions 2.1 to 2.4.
YES to one or more of questions 2.1 to 2.4.
Product does not meet criteria for inclusion in Division 2.
Product meets one or more criteria for inclusion in Division 2.
Is the product: • supplied or obtained, and • stored, handled or used for the reason that the organism or its toxin is present?
NO
YES
Is the product incidentally contaminated with the organism or its toxin?
YES
NO
Is the product a diagnostic specimen?
NO
YES
Is the organism assigned to Risk Categories II, III or IV by MRC/HWC or does it belong in such categories?
NO
YES
Product does not meet criteria for inclusion in Division 3.
Product meets criteria for inclusion in Division 3.

1. Division 1: Materials Causing Immediate and Serious Toxic Effects

The *Controlled Products Regulations*, Sections 46-51, provide the criteria for inclusion of a product within this Division and to Subdivisions A or B within it. Assignment of a product to Division 1 has implications for immediate adverse effects to workers resulting from their short-term exposure to the product.

Criteria are of three types:

a) acute toxicity tests;

b) assignment of the product to Division 1 of Class 6 (Poisonous Substances) under the Transportation of Dangerous Goods Regulations;

c) where the product is an untested mixture, the presence of a tested ingredient which meets either of criteria (a) or (b).

a) Acute Toxicity Tests (Reference: CPR, Sections 46, 49)

Under CPR, acute toxicity tests used for the assignment of products to Subdivisions A or B must be carried out in accordance with OECD Test Guidelines #401, 402 and 403 for Oral, Dermal and Inhalation toxicities as adopted 12 May 1981 or by other means established by Section 33 of CPR. The Guidelines provide criteria for animal selection, dose administration, observation periods and method of evaluating effects.

The rat is the preferred test animal for Methods 401 and 403; the rat, rabbit or guinea pig, for 402. In the oral test (401), a single dose is administered or repeated doses are administered within 24 hours; in the dermal test (402), a single dose is applied to the skin; and in the inhalation test (403), the animal is exposed to a test atmosphere for a period of four hours.

The observation period is usually 14 days or less. Acute toxicity in the OECD Guidelines is considered to be any adverse effect occurring within a short time of exposure. However, for the purposes of WHMIS classification, it is considered to be acute lethality; i.e. the capability of the product to cause death. For oral and dermal exposures, acute lethality is measured as the lethal dose of the product which will cause the death of 50 per cent of the test animals (termed LD_{50}). With inhalation experiments, lethality is measured in terms of lethal concentration of the product in air required to kill 50 per cent of the test animals, or LC_{50}.

LD_{50}'s are reported in units of milligrams of test substance per kilogram of body weight of test animal; inhalation LC_{50}'s, in parts per million (ppm) for gases and vapours, and in milligrams per cubic metre (mg/m^3) or per litre (mg/l) for dusts, mists and fumes.

Figure 8 provides a summary of the use of acute toxicity test results for the purpose of determining whether a product falls into Subdivisions A or B of Division 1 of Class D. Footnotes to the figure provide formulae for calculating equivalent LC_{50}'s where inhalation exposures in acute toxicity tests are for periods other than four hours.

b) Assignment to Class 6, Division 1
Under the TDG Regulations
(Reference: CPR, Sections 47 and 50)

A product falls into Class D, Division 1 of WHMIS if it is included in the equivalent category in TDG (Class 6, Division 1 - Poisonous and Infectious Substances). Three Packing Groups (I, II and III) are established within Class 6.1 of TDG to which products are assigned according to their level of hazard.

Products assigned to TDG Packing Groups I or II fall into WHMIS Subdivision A; those in Packing Group III, into Subdivision B.

Schedule II of the TDG Regulations provides a list of classification assignments for more than 3,000 products. For example, tetraethyl lead is assigned to Packing Group I of Class 6.1 (TDG) and therefore falls into Class D-1A (WHMIS); whereas sodium fluoride is assigned to TDG Packing Group III, and falls into WHMIS Class D-1B.

FIGURE 8

CRITERIA FOR ASSIGNMENT OF PRODUCTS TO SUBDIVISIONS A AND B OF DIVISION 1 OF CLASS D ON THE BASIS OF ACUTE TOXICITY TESTS

	Criteria for Assignment to Subdivision A	Criteria for Assignment to Subdivision B
Basis for Evaluation	Very Toxic Material	Toxic Material
1. Acute Oral Toxicity (OECD Test Guideline #401, May 12, 1981)	LD_{50} not more than 50 mg/kg	LD_{50} more than 50 but not more than 500 mg/kg
2. Acute Dermal Toxicity (OECD Test Guideline #402, May 12, 1981)	LD_{50} not more than 200 mg/kg	LD_{50} more than 200 but not more than 1,000 mg/kg
3. Acute Inhalation Toxicity (OECD Test Guideline #403, May 12, 1981), Exposure Period of 4 Hours*		
a) Product is a gas	LC_{50} not more than 2,500 ppm	No criterion
b) Product is a vapour	LC_{50} not more than 1,500 ppm and a saturated vapour concentration at normal atmospheric pressure greater than 2 times the LC_{50}	LC_{50} is more than 1,500 but not more than 2,500 ppm and a saturated vapour concentration at normal atmospheric pressure of more than 0.4 times the LC_{50}
c) Product is a dust, mist or fume	LC_{50} not more than 500 mg/m^3	LC_{50} is more than 500 but not more than 2,500 mg/m^3

* If the exposure period (Y) is not four hours in the test data, an equivalent LC_{50} can be calculated for four hours using one of two formulae:

a) For a gas or vapour

LC_{50} at 4 hours $= LC_{50}$ at Y hours $\times \frac{(\text{Y hours})^{1/2}}{2}$

Example: The vapour for an organic solvent has an LC_{50} of 100 ppm when the exposure period is 24 hours.

LC_{50} at 4 hours $= 100 \text{ ppm} \times \frac{(24)^{1/2}}{2}$

$= 100 \text{ ppm} \times 2.45$

$= 245 \text{ ppm}$

b) For a dust, mist or fume

LC_{50} at 4 hours $= LC_{50}$ at Y hours $\times \frac{(\text{Y hours})}{4}$

Example: The dust from a granular filtering material has an LC_{50} of 10 mg/m^3 when the exposure period is 2 hours.

LC_{50} at 4 hours $= 10 \text{ mg/m}^3 \times \frac{(2)}{(4)}$

$= 5 \text{ mg/m}^3$

c) Untested Mixtures (Reference: CPR, Sections 45-51)

If a product is an untested mixture, the means for determining whether the product falls into Class D, Division 1 is based on the properties of ingredients which are present in the mixture at a concentration of one per cent or more and whether the acute lethalities are known for all those ingredients.

- Case 1: The Acute Lethality for All Ingredients Present at a Concentration of One Per Cent or More is Not Known. For the purposes of classifying the product, the LD_{50} or LC_{50} of the mixture is taken as equal to that of the most acutely lethal ingredient for which the information is known and that is present in the mixture at a concentration of one per cent or more.

Example: In Degreasing Solvent ABC, the Oral LD_{50}'s of the ingredients are:

Ingredient	Concentration (%)	Oral LD50 (mg/kg)
A	89.5	Unknown
B	10	200-300
C	0.5	10

The Oral LD_{50} is taken as that for ingredient B. Two research studies which meet the standards of OECD Test Guideline #401 report LD_{50}'s of 200 and 300 mg/kg respectively. The accepted practice is to use the lower of the LD_{50} figures for purposes of classification. The Oral LD_{50} of the solvent mixture is 200 mg/kg and the product falls into Division 1, Subdivision B.

- Case 2: The Acute Lethality of Every Ingredient Present at a Concentration of One Per Cent or More is Known. In this case, for the purposes of classification, the acute lethality of the mixture must be determined by the formulae:

i) for a solid or a liquid

$$\frac{1}{\text{LD}_{50}\text{ of mixture}} = \frac{\text{proportion of ingredient A}}{\text{LD}_{50}\text{ of ingredient A}} + \frac{\text{proportion of ingredient B}}{\text{LD}_{50}\text{ of ingredient B}} + \ldots + \frac{\text{proportion of last ingredient}}{\text{LD}_{50}\text{ of last ingredient}}$$

ii) for a gas, vapour, dust, mist or fume

$$\frac{1}{\text{LC}_{50}\text{ of mixture}} = \frac{\text{proportion of ingredient A}}{\text{LC}_{50}\text{ of ingredient A}} + \frac{\text{proportion of ingredient B}}{\text{LC}_{50}\text{ of ingredient B}} + \ldots + \frac{\text{proportion of last ingredient}}{\text{LC}_{50}\text{ of last ingredient}}$$

NOTE: proportion = the weight of the ingredient divided by the weight of the mixture. It is recommended, but not required, that the lethalities of ingredients be based on tests of the same animal species.

Example: For the liquid Anticorrosion Product XYZ, the Oral LD_{50}'s of the ingredients are:

Ingredient	Concentration (%)	Oral LD50 (mg/kg)
X	90	800
Y	9.5	400
Z	0.5	10

$$\frac{1}{\text{LD}_{50}\text{ of mixture}} = \left(\frac{0.90}{800} + \frac{.095}{400}\right)\frac{\text{kg}}{\text{mg}}$$

$$= .00137\ \text{kg/mg}$$

Calculated LD_{50} of mixture = 730 mg/kg

NOTE: This mixture does not meet criteria for inclusion in Class D, in spite of the fact that one ingredient (Y) does meet the criterion for inclusion discussed in Case 1.

2. Division 2: Materials Causing Other Toxic Effects

The most common pattern of exposure to products in the workplace is in low, repeated doses that do not produce immediate, severe toxic effects. Division 2 includes criteria related to immediate but less severe effects such as skin or eye irritation, and to long-term (chronic) health effects that result from repeated or prolonged exposure to a product under conditions that do not produce an effect from a single exposure, or that develop over time following a single exposure to the product.

Seven types of adverse effects are covered in Division 2: skin or eye irritation, chronic toxic effects, carcinogenicity, reproductive toxicity, teratogenicity, mutagenicity and sensitization.

Division 2, like Division 1, is divided into Subdivisions A and B for Very Toxic and Toxic Materials. The different types of adverse health effects which appear in each of the Subdivisions are shown in Figure 9.

Chronic toxic, mutagenic and sensitization effects appear in both Subdivisions. In the case of chronic toxic effects, substances which produce effects at lower doses are considered Very Toxic; those which produce effects in higher doses, Toxic. Mutagenic substances fall into Subdivisions A or B depending on whether evidence involves germ (reproductive) cells or somatic (body) cells. For sensitizers, the product is considered Very Toxic if it affects the respiratory tract; Toxic if it affects the skin.

Four general rules for assigning products to Division 2 are:

1. **Any pure substance or tested mixture is included in Division 2, Subdivisions A or B, if it meets any of the criteria which appear in CPR, Sections 33 and 52-63.**

2. **If an untested mixture contains 0.1 per cent or more of a tested ingredient that meets any criterion for inclusion in Subdivision A for:**

   - **carcinogenicity;**
   - **reproductive toxicity;**
   - **teratogenicity and embryotoxicity;**
   - **mutagenicity of reproductive cells; or**
   - **sensitization of the respiratory tract;**

   then the untested mixture falls into Subdivision A.

3. **If an untested mixture contains one (1) per cent or more of a tested ingredient that meets any criterion for inclusion in Subdivision A for chronic toxic effects, then the untested mixture falls into Subdivision A.**

4. **If an untested mixture contains one (1) per cent or more of a tested ingredient that meets any criterion for inclusion in Subdivision B, then the untested mixture falls into Subdivision B.**

FIGURE 9

TYPES OF ADVERSE HEALTH EFFECTS APPEARING IN SUBDIVISIONS A AND B OF DIVISION 2

Subdivision A Very Toxic Material	Subdivision B Toxic Material
• Chronic Toxic Effects	• Chronic Toxic Effects
• Carcinogenicity	• Mutagenicity (of non-reproductive cells)
• Reproductive Toxicity	• Sensitization - Skin
• Teratogenicity and Embryotoxicity	• Skin or Eye Irritation
• Mutagenicity (of reproductive cells)	
• Sensitization - Respiratory Tract	

The criteria for inclusion of a product in Division 2 are discussed in detail in the remainder of this part of the Manual on the basis of the seven categories of adverse health effects in the Division.

a) Chronic Toxic Effects
(Reference: CPR, Sections 52, 59, 33[3])

Adverse health effects in this category include life threatening or serious impairment of body organs, and the cardiovascular or nervous systems.

Criteria for inclusion of a product in Division 2 on the basis of chronic toxic effects involve results from laboratory tests carried out in conformity with five OECD Test Guidelines (#408, 409, 411, 413 and 452). Test protocols involve either subchronic* (90-day) or chronic* periods in which lab animals are exposed to the product by oral, dermal or inhalation routes. Preferred animal species are: #408 - rodent, #409 - dog or primate, #411 - rat, rabbit or guinea pig, #413 - rodent and #452 - rodent and non-rodent.

Depending on the dose required to induce toxic effects, products are assigned to either Subdivision A or B of Division 2 as shown in Figure 10.

b) Carcinogenicity (Reference: CPR, Section 54)

Carcinogenicity refers to the capability of a product to cause cancer in animals or people that are exposed to it.

A product is a controlled product within Subdivision A of Division 2 of Class D if it appears on appropriate classification lists issued by either of two agencies, the American Conference of Governmental Industrial Hygienists (ACGIH) or the International Agency for Research on Cancer (IARC).

- American Conference of
  Governmental Industrial Hygienists

  A pure substance or tested mixture falls into Class D-2A on the basis of carcinogenicity if it is classified in Section A1 or A2 of Appendix A of Threshold Limit Values and Biological Exposure Indices published by the ACGIH. (Threshold limit value is a term used by the ACGIH to refer to exposure limits.)

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* "Subchronic" usually refers to toxic effects associated with repeated doses of a chemical over part, usually not exceeding ten per cent, of the average lifetime of experimental animals; "chronic" exposure periods to those covering a more substantial portion of lifetime.

FIGURE 10

CRITERIA FOR ASSIGNMENT OF PRODUCTS TO SUBDIVISIONS A AND B OF DIVISION 2 OF CLASS D

Basis for Evaluation*	Criterion for Assignment to Subdivision A Very Toxic Material	Criterion for Assignment to Subdivision B Toxic Material
Oral Route of Exposure 1. Subchronic Oral Toxicity - Rodent (OECD Test Guideline #408, 12 May 1981) 2. Subchronic Oral Toxicity - Non-Rodent (OECD Test Guideline #409, 12 May 1981) 3. Oral Route Test (OECD Test Guideline #452, 12 May 1981)	Dose of not more than 10 mg per kg of weight of test animal per day	Dose of more than 10 but not more than 100 mg per kg of weight of test animal per day
Dermal Route of Exposure 1. Subchronic Dermal Toxicity (OECD Test Guideline #411, 12 May 1981) 2. Dermal Route Test (OECD Test Guideline #452, 12 May 1981)	Dose of not more than 20 mg per kg of weight of test animal per day	Dose of more than 20 but not more than 200 mg per kg of weight of test animal per day
Inhalation Route of Exposure 1. Subchronic Inhalation Toxicity (OECD Test Guideline #413, 12 May 1981) 2. Inhalation Route Test (OECD Test Guideline #452, 12 May 1981)	Concentration of not more than 25 ppm by volume of a gas or vapour, or not more than 10 mg/m^3 of a dust, mist or fume	Concentration of more than 25 but not more than 250 ppm by volume of a gas or vapour, or more than 10 but not more than 100 mg/m^3 of a dust, mist or fume

* Where a 90-day or chronic test has not been done in accordance with OECD Test Guidelines, a 90-day or chronic test performed in accordance with the most recent US Food and Drug Administration (FDA) Guidelines or US Environmental Protection Agency (EPA) Guidelines as published in the *Federal Register* is acceptable.

Revisions to the publication are issued each year, usually in August or September. The conference also publishes Documentation of the Threshold Limit Values and Biological Exposure Indices, a compendium of position papers which summarize the rationales for assignment of TLV's.

Appendix A to the section on chemical substances in Threshold Limit Values and Biological Exposure Indices describes two categories of carcinogens to which substances or industrial processes may be assigned: **A1 - Confirmed Human Carcinogens**, and **A2 - Suspected Human Carcinogens**.

It has been past practice to subdivide chemicals in group A1 into Subgroups A1a and A1b depending on whether or not a threshold limit value had been assigned to the chemical. Irrespective of any such subdivisions, a product designated as either A1 or A2 is a controlled product within the meaning of Division 2 of Class D.

Figure 11 shows the assignment of substances to groups A1 and A2 current to 1987-1988.

Three precautions are required when using ACGIH information:

i) Always use the most current edition of ACGIH listings.

ii) Where a group of products is listed; for example, "certain water insoluble compounds" of chromium (VI), consult the Documentation of the Threshold Limit Values and Biological Exposure Indices for more detailed information on compound identification.

iii) Appendix A includes occasional reference to industrial processes; for example, antimony trioxide production, where specific causative agents have not been confirmed but the ACGIH considers exposure to the process to be causally associated with increased risk of cancer. WHMIS involves classification of products not industrial processes. However, employers or suppliers involved with such processes ought to be aware of information available from the ACGIH Documentation publication.

FIGURE 11

ASSIGNMENT OF SUBSTANCES AS CARCINOGENS IN THRESHOLD LIMIT VALUES AND BIOLOGICAL EXPOSURE INDICES (1987-1988) *

Confirmed Human Carcinogens (A1)	Suspected Human Carcinogens (A2)
Asbestos 4-Aminodiphenyl Benzidine Bis(chloromethyl)ether Chromite ore processing (Chromate) Chromium (VI), certain water insoluble compounds Coal tar pitch volatiles ß-Naphthylamine Nickel sulfide roasting, fume and dust 4-Nitrodiphenyl Vinyl chloride	Acrylamide Acrylonitrile Antimony trioxide production Arsenic trioxide production Benzene Benzo(a)pyrene Beryllium and compounds 1,3-Butadiene Carbon tetrachloride Chloroform Chloromethyl methyl ether Chrysene 3,3'-Dichlorobenzidine Dimethyl carbamoyl chloride 1,1-Dimethylhydrazine Dimethyl sulphate Ethylene dibromide Ethylene oxide Formaldehyde Hexachlorobutadiene Hexamethyl phosphoramide Hydrazine Lead chromate 4,4'-Methylene bis (2-chloroaniline) 4,4'-Methylene dianiline Methyl hydrazine Methyl iodide 2-Nitropropane N-Nitrosodimethylamine N-Phenyl-beta-naphthylamine Phenylhydrazine Propane sultone ß-Propiolactone Propylene imine o-Tolidine o-Toluidine p-Toluidine Vinyl bromide Vinyl cyclohexene dioxide Zinc chromate

* The ACGIH publishes list revisions in August-September of each year.

- International Agency for Research on Cancer

A pure substance or tested mixture falls into Class D on the basis of carcinogenicity if it is listed in Groups 1 or 2 in the IARC monograph and supplement series on the Evaluation of the Carcinogenic Risk of Chemicals to Humans as published by the World Health Organization.

Individual Monographs provide detailed discussion of the properties of various chemicals, groups of chemicals or industrial processes. Three types of evidence are considered when assessing cancer-causing properties:

- human evidence from case reports and epidemiological studies;
- experimental animal tests conducted in laboratories; and
- short-term tests for DNA damage and chromosomal effects in plant, insect or mammalian cells.

The level of evidence for each type is judged to be sufficient, limited, inadequate, negative or not available.

IARC periodically publishes Supplements to the Monographs in which chemicals previously monographed are assigned to one of four Groups:

- Group 1: **Carcinogenic to Humans**
- Group 2:
    - **Group 2A: Probably Carcinogenic to Humans**
    - **Group 2B: Possibly Carcinogenic to Humans**
- Group 3: **Cannot Be Classified as to Carcinogenicity to Humans**
- Group 4: **Probably Not Carcinogenic to Humans**

Figure 12 shows the IARC group assignments in Supplement #7, 1988.

For chemicals evaluated in IARC Monographs issued after the most recently available Supplement and not formally assigned to Groups, the following generalizations apply.

i) If there is sufficient evidence of carcinogenicity to humans, IARC invariably assigns the product to Group 1, irrespective of evidence on experimental animals or from short-term tests.

ii) If there is limited evidence of carcinogenicity to humans, the chemical is invariably assigned to Group 2. If there is sufficient evidence of carcinogenicity from animal studies, the product is likely to be assigned to Subgroup 2A; otherwise, 2B.

iii) If there is inadequate evidence of carcinogenicity in humans, but sufficient evidence in animal studies, IARC usually assigns the chemical to Group 2, irrespective of the nature of short-term test results.

iv) If evidence from animal studies is limited or inadequate, the product is usually assigned to Group 3.

As with ACGIH lists, precautions are necessary when using IARC information.

i) Always use the most recently available information. IARC Monograph Supplements are published less frequently than ACGIH revisions. Products on which Monographs are issued following the most recent classification lists can be evaluated using generalizations (i)-(iv) above.

ii) Where groups of products appear in IARC lists, the agency may clarify the intent by footnote. For example, with "arsenic and arsenic compounds", IARC states that the "evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals within the group". Consult individual product Monographs in this case to clarify the status of unspecified compounds.

iii) WHMIS classification criteria apply only to products, not to processes. Where IARC classifies a process (e.g. manufacture of magenta) as carcinogenic, employers or suppliers involved with such processes ought to be aware of information available in the applicable Monograph.

FIGURE 12

ASSIGNMENTS OF SUBSTANCES AND PROCESS AS CARCINOGENIC AS REPORTED IN IARC MONOGRAPHS, SUPPLEMENT 7, 1988

Group 1: Carcinogenic to Humans

Chemicals and groups of chemicals:

Aflatoxins
4-Aminobiphenyl
Analgesic mixtures containing phenacetin
Arsenic and arsenic compounds*
Asbestos
Azathioprine
Benzene
Benzidine
Betal quid with tobacco
N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)
Bis(chloromethyl)ether and chloromethyl methyl ether (technical-grade)
1,4-Butanediol dimethanesulphonate (Myleran)
Chlorambucil
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU)
Chromium compounds, hexavalent*
Coal-tar pitches
Coal-tars
Cyclophosphamide
Diethylstilboestrol
Erionite
Melphalan
8-Methoxypsoralen (Methoxsalen) plus ultraviolet radiation
Mineral oils, untreated and mildly treated
MOPP (combined therapy with nitrogen mustard, vincristine, procarbazine and prednisone) and other combined chemotherapy including alkylating agents
Mustard gas (Sulphur mustard)
2-Naphthylamine
Nickel and nickel compounds*
Oestrogen replacement therapy
Oestrogens, nonsteroidal*
Oestrogens, steroidal*
Oral contraceptives, combined†
Oral contraceptives, sequential
Shale-oils
Soots
Talc containing asbestiform fibres
Tobacco products, smokeless
Tobacco smoke
Treosulphan
Vinyl chloride

Industrial processes and occupational exposures:

Aluminum production
Auramine, manufacture of
Boot and shoe manufacture and repair
Coal gasification
Coke production
Furniture and cabinet making
Haematite mining, underground, with exposure to radon
Iron and steel founding
Isopropyl alcohol manufacture, strong-acid process
Magenta, manufacture of
Rubber industry

Group 2A: Probably Carcinogenic to Humans

Acrylonitrile
Adriamycin
Androgenic (anabolic) steroids
Benz[a]anthracene
Benzidine-based dyes
Benzo[a]pyrene
Beryllium and beryllium compounds
Bischloroethyl nitrosourea (BCNU)
Cadmium and cadmium compounds
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU)
Cisplatin
Creosotes
Dibenz[a,h]anthracene
Diethyl sulphate
Dimethylcarbamoyl chloride
Dimethyl sulphate
Epichlorohydrin
Ethylene dibromide
Ethylene oxide
N-Ethyl-N-nitrosourea
Formaldehyde
5-Methoxypsoralen
4,4'-Methylene bis(2-chloroaniline) (MOCA)
N-Methyl-N'-nitro-N-nitrosoguanidine (MNNG)
N-Methyl-N-nitrosourea
Nitrogen mustard
N-Nitrosodiethylamine
N-Nitrosodimethylamine
Phenacetin
Polychlorinated biphenyls
Procarbazine hydrochloride
Propylene oxide
Silica, crystalline
Styrene oxide
Tris(1-aziridinyl)phosphine sulphide (Thiotepa)
Tris(2,3-dibromopropyl)phosphate
Vinyl bromide

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* This evaluation applies to the group of chemicals as a whole and not necessarily to all individual chemicals wtihin the group.

† There is also conclusive evidence that these agents have a protective effect against cancers of the ovary and endometrium.

FIGURE 12 (cont'd)

ASSIGNMENTS OF SUBSTANCES AND PROCESS AS CARCINOGENIC AS REPORTED IN IARC MONOGRAPHS, SUPPLEMENT 7, 1988

Group 2B: Possibly Carcinogenic to Humans

A-a-C (2-Amino-9H-pyrido[2,3-b]indole)
Acetaldehyde
Acetamide
Acrylamide
AF-2 [2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide]
para-Aminoazobenzene
ortho-Aminoazotoluene
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole
Amitrole
ortho-Anisidine
Aramite®
Auramine, technical-grade
Azaserine
Benzo[b]fluoranthene
Benzo[j]fluoranthene
Benzo[k]fluoranthene
Benzyl violet 4B
Bitumens, extracts of steam-refined and air-refined
Bleomycins
Bracken fern
1,3-Butadiene
Butylated hydroxyanisole (BHA)
ß-Butyrolactone
Carbon-black extracts
Carbon tetrachloride
Carpentry and joinery
Carrageenan, degraded
Chloramphenicol
Chlordecone (Kepone)
a-Chlorinated toluenes
Chloroform
Chlorophenols
Chlorophenoxy herbicides
4-Chloro-ortho-phenylenediamine
para-Chloro-ortho-toluidine
Citrus Red No. 2
para-Cresidine
Cycasin
Dacarbazine
Daunomycin
DDT
N,N'-Diacetylbenzidine
2,4-Diaminoanisole
4,4'-Diaminodiphenyl ether
2,4-Diaminotoluene
Dibenz[a,h]acridine
Dibenz[a,j]acridine
7H-Dibenzo[c,g]carbazole
Dibenzo[a,e]pyrene
Dibenzo[a,h]pyrene
Dibenzo[a,i]pyrene
Dibenzo[a,l]pyrene
1,2-Dibromo-3-chloropropane
para-Dichlorobenzene
3,3'-Dichlorobenzidine
3,3'-Dichloro-4,4'-diaminodiphenyl ether
1,2-Dichloroethane
Dichloromethane
1,3-Dichloropropene (technical-grade)
Diepoxybutane
Di(2-ethylhexyl)phthalate
1,2-Diethylhydrazine
Diglycidyl resorcinol ether
Dihydrosafrole
3,3'-Dimethoxybenzidine (ortho-Dianisidine)
para-Dimethylaminoazobenzene
trans-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]-1,3,4-oxadiazole
3,3'-Dimethylbenzidine (ortho-Tolidine)
1,1-Dimethylhydrazine
1,2-Dimethylhydrazine
1,4-Dioxane
Ethyl acrylate
Ethylene thiourea
Ethyl methanesulphonate
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole
Glu-P-1 (2-Amino-6-methyldipyrido[1,2-a:3',2'-d] imidazole)
Glu-P-2 (2-Aminodipyrido[1,2-a:3',2'-d] imidazole)
Glycidaldehyde
Griseofulvin
Hexachlorobenzene
Hexachlorocyclohexanes
Hexamethylphosphoramide
Hydrazine
Indeno[1,2,3-cd]pyrene
IQ (2-Amino-3-methylimidazo[4,5-f]quinoline)
Iron-dextran complex
Lasiocarpine
Lead and lead compounds, inorganic
MeA-a-C (2-Amino-3-methyl-9H-pyrido[2,3-b] indole)
Medroxyprogesterone acetate
Merphalan
2-Methylaziridine
Methylazoxymethanol and its acetate
5-Methylchrysene
4,4'-Methylene bis(2-methylaniline)
4,4'-Methylenedianiline
Methyl methanesulphonate
2-Methyl-1-nitroanthraquinone (uncertain purity)
N-Methyl-N-nitrosourethane
Methylthiouracil
Metronidazole
Mirex
Mitomycin C
Monocrotaline
5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene) amino]-2-oxazolidinone
Nafenopin

FIGURE 12 (cont'd)

ASSIGNMENTS OF SUBSTANCES AND PROCESS AS CARCINOGENIC AS REPORTED IN IARC MONOGRAPHS, SUPPLEMENT 7, 1988

Group 2B: (cont'd)

Niridazole
5-Nitroacenaphthene
Nitrofen (technical-grade)
1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone
N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide
Nitrogen mustard N-oxide
2-Nitropropane
N-Nitrosodi-n-butylamine
N-Nitrosodiethanolamine
N-Nitrosodi-n-propylamine
3-(N-Nitrosomethylamino)propionitrile
4-(N-Nitrosomethylamino)-1-(3-pyridyl)-
  1-butanone (NNK)
N-Nitrosomethylethylamine
N-Nitrosomethylvinylamine
N-Nitrosomorpholine
N-Nitrosonornicotine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
N-Nitrososarcosine
Oil Orange SS
Panfuran S (containing
  dihydroxymethylfuratrizine)
Phenazopyridine hydrochloride
Phenobarbital
Phenoxybenzamine hydrochloride
Phenytoin
Polybrominated biphenyls
Ponceau MX
Ponceau 3R
Potassium bromate
Progestins
1,3-Propane sultone
ß-Propiolactone
Propylthiouracil
Saccharin
Safrole
Sodium ortho-phenylphenate
Sterigmatocystin
Streptozotocin
Styrene
Sulfallate
2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD)
Tetrachloroethylene
Thioacetamide
4,4'-Thiodianiline
Thiourea
Toluene diisocyanates
ortho-Toluidine
Toxaphene (Polychlorinated camphenes)
Trp-P-1 (3-Amino-1,4-dimethyl-5H-pyrido
  [4,3-b]indole)
Trp-P-2 (3-Amino-1-methyl-5H-pyrido[4,3-b]
  indole)
Trypan blue
Uracil mustard
Urethane

NOTE: IARC and ACGIH do not provide identical lists. A product need only appear on one list in order to be included within WHMIS as a carcinogen. If a product appears as a carcinogen in lists from both agencies but in different hazard categories, the ranking is irrelevant from the point of view of classification, but may have implications for reporting information on the material safety data sheet. For example, benzene is ranked as a "suspected human carcinogen" by ACGIH (Appendix A2) but as "carcinogenic to humans" (Group 1) by IARC. In either event, it is classified as a carcinogen in WHMIS. However, when reporting carcinogenicity on the material safety data sheet, it is appropriate, in conformity with CPR, Section 13(1), to report both rankings, if not the IARC ranking alone.

c) Reproductive Toxicity (Reference: CPR, Section 55)

Reproductive toxicity, for the purposes of WHMIS, refers to the effect of a product on the capability of mammals to produce offspring. Effects may occur in either the male or female.

A product is a reproductive toxin within the meaning of Subdivision A of Division 2 of Class D if there is evidence that it causes sterility or an adverse effect on reproductive capability either in:

i) persons, following exposure to the product in the workplace; or

ii) an animal assay conducted in accordance with OECD Test Guidelines #415, "One-Generation Reproduction Toxicity" or #416, "Two-Generation Reproduction Toxicity", as adopted on 28 May 1983.

Evidence assessed under criterion (i) must be based on sound epidemiological principles. While the criterion refers to exposure in the workplace, the supplier "ought to be aware" of studies which show adverse reproductive effects resulting from exposure outside the workplace, at minimum for the purposes of reporting results from such studies on material safety data sheets.

Criterion (ii) involves one- and two-generation studies on preferred species of mice or rats, with parent dosing periods of at least one spermatogenic cycle for males and two oestrous cycles for females. Measures of effect include gonadal function, oestrous cycle, mating behaviour, conception, parturition (birth of offspring), lactation and weaning. The reproductive studies may also provide preliminary information about developmental toxic effects of the test product such as neonatal morbidity, mortality, behaviour and teratogenesis, and can serve as a guide for subsequent tests.

d) Teratogenicity and Embryotoxicity
(Reference: CPR, Sections 53, 33[3])

These effects refer to the capability of a product to produce injuries in offspring resulting from exposure of the pregnant female to the product at a concentration that has no adverse effect on the female. Injuries include death, physical malformation, permanent metabolic or physiological dysfunction, growth retardation or psychological or behavioural alteration that occurs during pregnancy, at birth or in the postnatal period. The embryonic stage of development of the human fetus, between two to eight weeks, is particularly at risk of injury to such products.

A pure substance or tested mixture falls into Subdivision A of Division 2 of Class D if, in an animal assay for teratogenicity and embryotoxicity, it is shown to cause injury to the embryo or fetus in a statistically significant proportion of the test population at a concentration that has no adverse effect on the pregnant female when tested in accordance with:

i) OECD Test Guideline No. 414, "Teratogenicity", dated May 12, 1981;

ii) OECD Test Guideline No. 415, "One-Generation Reproduction Toxicity", dated May 26, 1983; or

iii) OECD Test Guideline No. 416, "Two-Generation Reproduction Toxicity", dated May 26, 1983.

Guideline #414 involves administration of the product to pregnant females of the test species, preferably rat or rabbit, throughout the period of pregnancy. One day prior to term, fetuses are delivered by hysterectomy and examined for abnormalities. Guidelines #415 and 416, as discussed in the section on Reproductive Toxicity, are intended primarily to provide evidence of the capability of the product to adversely effect the ability of mammals to reproduce. Reproductive studies can also provide preliminary information about developmental toxic effects of the test product such as teratogenicity and embryotoxicity and thus serve as a guide for subsequent tests.

Where there are no tests for teratogenicity carried out in accordance with OECD Test Guidelines, tests must be in conformity with a test or method described in Principles for the Testing of Drugs for Teratogenicity, Technical Report Series Number 364, published in 1967 by the WHO, or be carried out according to generally accepted standards of good scientific practice of the time.

e) Mutagenicity (Reference: CPR, Sections 57, 62, 33[3])

Mutagenicity is the capability of a substance to cause mutations in living cells. A mutation is the change in the information content, organization, expression or amount of the genetic material, DNA, and may be spontaneous, or be caused by exposure to a physical or chemical agent.

Mutations can occur in either germ (reproductive) or somatic (body) cells. Germ cell mutations are those occurring in cells that give rise to eggs or sperm, and are transmitted to future generations, sometimes as genetic disorders. Somatic mutations occur in non-reproductive tissue and are not transmitted to offspring, but can play a role in the development of diseases such as cancer or atherosclerosis. Both males and females of a species may be at risk of effects on exposure to a product which is mutagenic to the species.

A product falls into Subdivision A or Subdivision B of Division 2 of Class D for reasons of mutagenicity depending on whether it causes effects on germ or somatic cells respectively.

The criteria for assigning products to the Subdivisions are summarized in Figure 13. Criterion tests involve only mammalian cells (as opposed to bacteria, insect, yeast cells, etc.) when studied *in vivo*; i.e. studied in a living organism (as opposed to *in vitro* studies, in a test tube or Petri dish).

Studies must be in accordance with test methods described in the "Introduction to the OECD Guidelines on Genetic Toxicology Testing and Guidance on the Selection and Application of Assays". The Guidelines reference a substantial number of test protocols, about half of which are concerned with mammalian *in vivo* methods.

Strategies for selecting methods must be in accordance with those outlined in Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals published by Health and Welfare and Environment Canada. Figure 5-1 on page 69 of the Guidelines outlines the mutagenicity testing strategy, based on the potential for worker exposure to the product.

FIGURE 13

CRITERIA USED TO ASSIGN PRODUCTS TO SUBDIVISIONS A AND B OF DIVISION 2 OF CLASS D, BASED ON MUTAGENIC EFFECTS

Subdivision A: Very Toxic Material

a) there is epidemiological evidence that shows a causal connection between exposure of persons to the substance or mixture and heritable genetic effects; or

b) there is evidence* of mutagenicity in mammalian germ cells *in vivo* as shown by:

  i) positive results in a study that measures mutations transmitted to offspring, or

  ii) positive results in an *in vivo* study showing chemical interaction with the genetic materials of mammalian germ cells and positive results in an *in vivo* study assessing either gene mutation or chromosomal aberration in somatic cells.

Subdivision B: Toxic Material

a) there is evidence* of mutagenicity in mammalian somatic cells *in vivo* obtained in a test to assess either gene mutation or chromosomal aberration.

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* Evidence must be obtained:

- in accordance with test methods described in the "Introduction to the OECD Guidelines on Genetic Toxicology Testing and Guidance on the Selection and Application of Assays" published in the Third Addendum to the *OECD Guidelines for Testing of Chemicals*, dated March 1, 1987; and
- using testing strategies described in the *Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals*, dated 1986, published under the authority of the Minister of National Health and Welfare and the Minister of the Environment.

Where no tests have been done in accordance with the above Guidelines, it is acceptable to use the results from either:

- a test or method described by the US Environmental Protection Agency (EPA) in "Proposed Guidelines for Registering Pesticides in the US; Hazard Evaluation: Human and Domestic Animals", as published in volume 43 of the *Federal Register* (No. 163), dated 1978, at pages 37, 336-37, 403; or
- any other test or method that is carried out in accordance with generally accepted standards of good scientific practice at the time the test was carried out.

f) Sensitization (Reference: CPR, Sections 56, 61)

Sensitization involves allergic response and is the process whereby a person or animal is exposed to a substance which at first causes little or no reaction in the immune system, but which, on repeated exposure, induces a much stronger immune response, not necessarily limited to the contact site. Typically, people have very different responses to sensitizers, and there is little relationship between level of exposure and degree of response. Sensitization differs from irritation or corrosion, which do not involve allergic response.

Symptoms of sensitization include erythema (reddening of the skin), blisters, fissuring of tissue and discharge of fluid. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization is also known.

A pure substance or tested mixture falls into Subdivision A of Division 2 of Class D if there is evidence that shows it causes respiratory tract sensitization in persons following exposure to it in the workplace. Ethylene diamine and various isocyanates such as toluene diisocyanate (TDI) are examples of substances which can cause sensitization of the respiratory tract.

A product falls into Subdivision B of Division 2 of Class D if it causes skin sensitization within either of two criteria:

i) In an animal assay carried out in accordance with OECD Test Guideline No. 406, "Skin Sensitization", dated May 12, 1981,

- **it produces a response in 30 per cent or more of the test animals, when using one of the techniques incorporating the use of an adjuvant; or**

- **It produces a response in 15 per cent or more of the test animals, when using one of the techniques not incorporating the use of an adjuvant; or**

ii) evidence shows that it causes skin sensitization in persons following exposure in a workplace.

OECD Guideline #406 lists seven methods for evaluation which are considered acceptable. In all cases, following initial exposure to a test substance, the animals (guinea pigs are recommended) are subsequently subjected, after a period of not less than one week, to a challenge exposure with the test substance to establish whether a hypersensitive state has been induced. Nickel, glutaraldehyde, pyrethrum and various chromates are examples of substances which can cause skin sensitization.

g) Skin or Eye Irritation
(Reference: CPR, Sections 60, 33[3])

Irritation is the production of reversible inflammatory changes of the skin or eye following contact with a substance.* Primary irritation is a localized response at the site of contact; secondary irritation is a response at a site other than the site of contact.

Effects of irritants on the skin include erythema (reddening), eschar (sloughing) or edema (swelling); and on the eyes, corneal or iris damage and swelling or redness of the conjunctiva.

A pure substance or tested mixture falls into Subdivision B of Division 2 of Class D if, in an animal test conducted in accordance with the applicable OECD Test Guideline, it exceeds the criteria listed in Figure 14 as measured at any time specified in the test.

The preferred test animal for both types of tests is the albino rabbit. The product is applied to the skin or eyes as per test guidelines. Observation periods are normally not longer than 14 days for dermal applications, 21 days for the eyes.

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* **NOTE: Irritation is different from corrosion, which is production of irreversible tissue damage at the site of contact due to chemical reaction between the product and the tissue. Products which are corrosive to the skin fall into WHMIS Class E - Corrosive Material. Neither irritation or corrosion involve an allergic response and in that sense are different from sensitization. Sensitizers fall into Subdivisions A or B of Division 2 of Class D depending on whether they cause respiratory sensitization or only skin sensitization.**

FIGURE 14

CRITERIA FOR ASSIGNING A PRODUCT TO SUBDIVISION B ON THE BASIS OF SKIN OR EYE IRRITATION

Location of Application of the Product	Applicable OECD Test Guideline	Criteria
Skin	#404, Acute Dermal Irritation/ Corrosion, dated May 12, 1981	1. Erythema Formation - a mean of two or more (i.e. well-defined erythema) 2. Edema Formation - a mean of two or more (i.e. slight edema)
Eyes	#405, Acute Eye Irritation/ Corrosion, dated May 12, 1981	1. Corneal Damage - a mean of two or more (i.e. easily observable translucence) 2. Iris Damage - a mean of one or more (i.e. marked congestion, swelling, etc. but iris still reacting to light) 3. Conjunctival Swelling or Redness - a mean of 2.5 (i.e. diffuse crimson) or more (beefy red)

If tests have not been conducted in accordance with applicable OECD Guidelines, the Draize Test, as described in volume 82 of The Journal of Pharmacology and Experimental Therapeutics, dated 1944, pages 377-390, is acceptable.

3. Division 3: Biohazardous Infectious Material*
(Reference: CPR, Section 64)

Division 3 of Class D applies to any organism that has been shown to cause disease or is reasonably believed to cause disease in persons or animals, and the toxins of such an organism. Organisms may be viral, bacterial, rickettsial, fungal, protozoal or helminthic. Organisms which cause disease in animals are of concern to WHMIS particularly where transmission of the disease may occur from animals to persons. Such diseases are termed "zoonoses". Examples include psittacosis, Q-fever, trichinosis and rabies.

For the purposes of WHMIS, biohazardous infectious materials are normally those materials which contain organisms likely to cause disease and which are supplied or obtained, and stored, handled or used for the reason that the organism is present.

As such, they include:

- cultures, concentrates or other form of production of such organisms;
- diagnostic specimens such as blood, feces, sputum, urine, organs or body tissue which contain such organisms.

Typically, these materials will be found in laboratory and research facilities, particularly associated with the medical and agricultural sectors.

Biohazardous infectious materials within the meaning of Division 3 do not normally include:

- plants, animals, foods, soils or goods (e.g. isolation linen) which may be incidentally contaminated with disease-causing organisms, unless considered diagnostic specimens; or
- any organism which is unlikely to cause human disease or animal disease of veterinary importance.

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* This interpretation of CPR Section 64 on pages 2-47 to 2-50 of this Manual is considered as draft material for review and educational purposes only.

For the purposes of determining whether an organism is biohazardous, i.e. capable of causing disease, the classification system of the World Health Organization is used.

Organisms are assigned to one of four risk (or hazard) groups on the basis of capability of an organism to cause disease in people. Risk group descriptions and examples are shown in Figure 15.

An organism is considered to be biohazardous within the meaning of Division 3 if it falls into Groups II, III or IV.

The World Health Organization has advised each country to draw up a classification list by risk group of the organisms encountered in that country, based on the risk factors:

- pathogenicity of the organism;
- availability of effective treatment;
- modes of transmission and host range of the organism; and
- availability of effective preventive measures.

The Medical Research Council of Canada and Health and Welfare Canada can be considered appropriate agencies for the classification of microorganisms in Canada.*

Where an organism has not been assigned to a risk group by these agencies, its assignment should be based on similarity to organisms already assigned and on the risk factors identified by the WHO.

Figure 16 provides a summary of the decision sequence used when applying criteria for inclusion in Division 3 of Class D.

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* Where an agency identifies a Risk Group V to cover pathogens not indigenous to Canada and which would be of extreme harm were they to be introduced, such pathogens would fall within WHMIS were they to be present in the workplace; for example, under special permission from federal authorities.

FIGURE 15

CLASSIFICATION OF INFECTIVE MICROORGANISMS BY RISK GROUP

Risk Group I (low worker and community risk)

A microorganism that is unlikely to cause significant human disease. Examples: Bacillus subtilis, Escherichia coli (non-toxigenic strains).

Risk Group II (moderate worker risk, limited community risk)

A pathogen that can cause human disease but is unlikely to be a serious hazard to workers or the community. Workplace exposures may cause serious infection, but effective treatment and preventive measures are available and the risk of spread of the pathogen is limited. Examples: Salmonella, Trichinella spiralis, Mumps virus.

Risk Group III (high worker risk, low community risk)

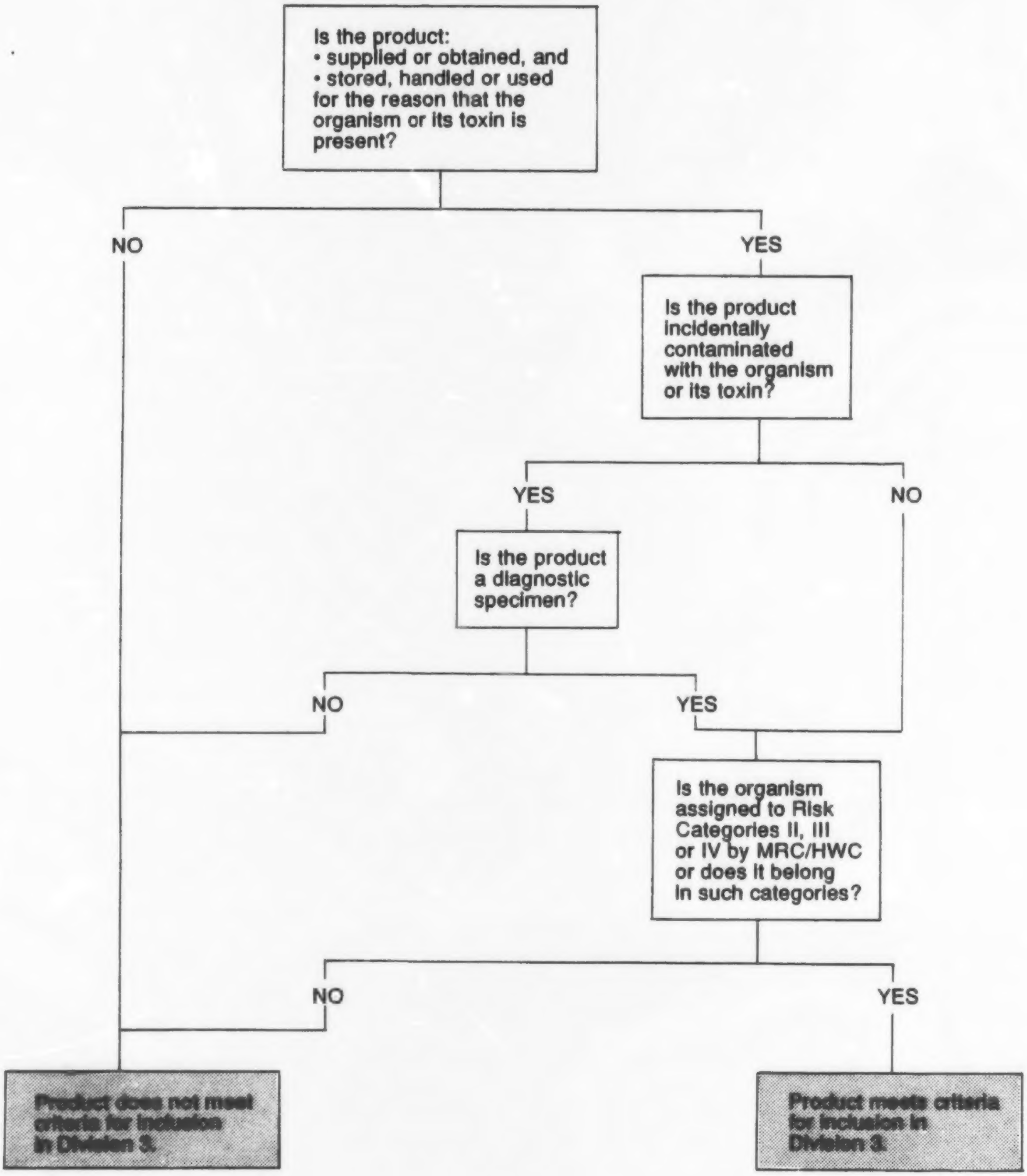
A pathogen that usually produces serious human disease but where the pathogen does not ordinarily spread by casual contact from one infected individual to another. Examples: Brucella spp., AIDS viruses, Blastomyces dermatitidis.

Risk Group IV (high worker and community risk)

A pathogen that usually produces very serious human disease, often untreatable, and where the pathogen may be readily transmitted from one individual to another, directly or indirectly. Examples: Ebola virus, Lassa virus, Marburg virus.

FIGURE 16

DECISION TREE: CRITERIA FOR INCLUSION IN DIVISION 3 OF CLASS D - BIOHAZARDOUS INFECTIOUS MATERIAL


Is the product:
• supplied or obtained, and
• stored, handled or used for the reason that the organism or its toxin is present?
NO
YES
Is the product incidentally contaminated with the organism or its toxin?
YES
NO
Is the product a diagnostic specimen?
NO
YES
Is the organism assigned to Risk Categories II, III or IV by MRC/HWC or does it belong in such categories?
NO
YES
Product does not meet criteria for inclusion in Division 3.
Product meets criteria for inclusion in Division 3.

2.4.7 CLASS E - CORROSIVE MATERIAL (Reference: CPR, Section 65)

There are six criteria for determining whether a product, material or substance is included in Class E. Criteria are of three basic types: those related to corrosion of metal, corrosive effects on human skin, and the requirements of the Transportation of Dangerous Goods Regulations.

Criteria for Inclusion in Class E

1. **The product corrodes SAE 1020 steel or 7075-T6 non-clad aluminum surfaces at a rate exceeding 6.25 mm per year at a test temperature of 55°C when tested in accordance with Test Method "Laboratory Corrosion Testing of Metals for the Process Industries", NACE Standard TM-01-69 (1976 Revision).**

2. **The product is corrosive to the skin when tested in accordance with OECD Test Guideline No. 404, "Acute Dermal Irritation/Corrosion", dated May 12, 1981.** Corrosion is the production of irreversible tissue damage to the skin as a result of chemical reaction between the product and dermal tissue. It differs from irritation which is the production of reversible inflammatory changes. Skin irritants fall into Division 2 of Class D. The test protocol in Guideline No. 404 calls for application to a minimum for three adult animals, preferably albino rabbits, for an observation period not normally more than 14 days.

3. **There is evidence that the product causes visible necrosis (death) of human skin tissue.**

   Fresh chemical burns are often white, or in some cases are stained yellow (for example, if caused by nitric acid, picric acid). Caustic burns result in a sloughy skin. Dead tissue often turns black due to degenerating hemoglobin pigments.

4. **The product is an untested mixture which contains a product, material or substance that meets criteria (2) or (3) and is present in a concentration of at least one per cent.**

5. **The product is a gas included in Division 4 of Class 2 (Corrosive Gas) under the Transportation of Dangerous Goods Regulations.**

Products in TDG Division 4 have an LC_{50} value of less than 5,000 mL/m^3 at normal atmospheric pressure by reason of corrosion effects on tissues of the respiratory tract. Chlorine, anhydrous hydrogen bromide and anhydrous hydrogen chloride are examples.

6. **The product is included in Class 8 (Corrosives) under the Transportation of Dangerous Goods Regulations.**

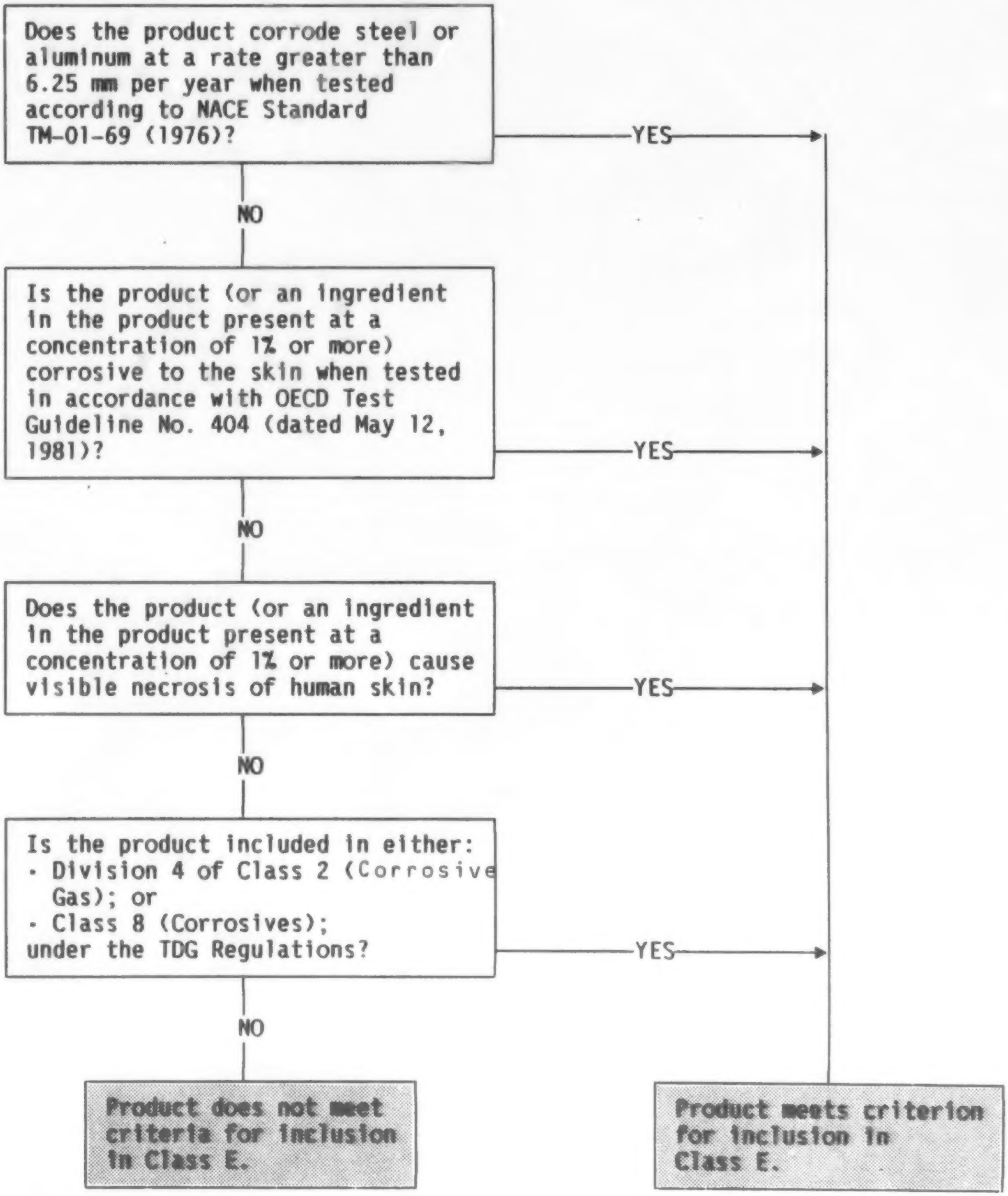
   __NOTE__: Wastes which have a pH less than 2.0 or greater than 12.5 are included in TDG Class 8. This one criterion for inclusion in Class 8 does not bring a product into WHMIS Class E because the *Controlled Products Regulations* do not apply to hazardous wastes (Reference: __Hazardous Products Act__, Section 12).

Figure 17 provides a summary of the decision sequence used when applying criteria for inclusion in Class E.

FIGURE 17

DECISION TREE: CRITERIA FOR INCLUSION IN CLASS E - CORROSIVE MATERIAL

(Reference: CPR, Section 65)



Does the product corrode steel or aluminum at a rate greater than 6.25 mm per year when tested according to NACE Standard TM-01-69 (1976)?

Is the product (or an ingredient in the product present at a concentration of 1% or more) corrosive to the skin when tested in accordance with OECD Test Guideline No. 404 (dated May 12, 1981)?

Does the product (or an ingredient in the product present at a concentration of 1% or more) cause visible necrosis of human skin?

Is the product included in either:
- Division 4 of Class 2 (Corrosive Gas); or
- Class 8 (Corrosives);

under the TDG Regulations?

Product does not meet criteria for inclusion in Class E.

Product meets criterion for inclusion in Class E.

2.4.8 CLASS F - DANGEROUSLY REACTIVE MATERIAL

(Reference: CPR, Section 66)

A product, material or substance is included in this Class if it meets any one of three criteria:

1. **It undergoes vigorous polymerization, decomposition or condensation.** For example, the monomeric product 1,3-butadiene will undergo hazardous self-polymerization unless inhibitors are added to prevent the process from occurring.

2. **It becomes self-reactive under conditions of shock or increase in pressure or temperature.** For example, metal azides and acetylides can be explosive if subjected to physical shock.

3. **It reacts vigorously with water to release a gas that has an LC_{50} not exceeding 2,500 parts per million by volume of gas, when tested for four hours in accordance with OECD Test Guideline No. 403, "Acute Inhalation Toxicity", dated May 12, 1981.** For example, alkali metal cyanides will liberate the highly toxic gas, hydrogen cyanide, on contact with water.

Figure 18 provides a summary of the decision sequence used when applying criteria for inclusion in Class F.

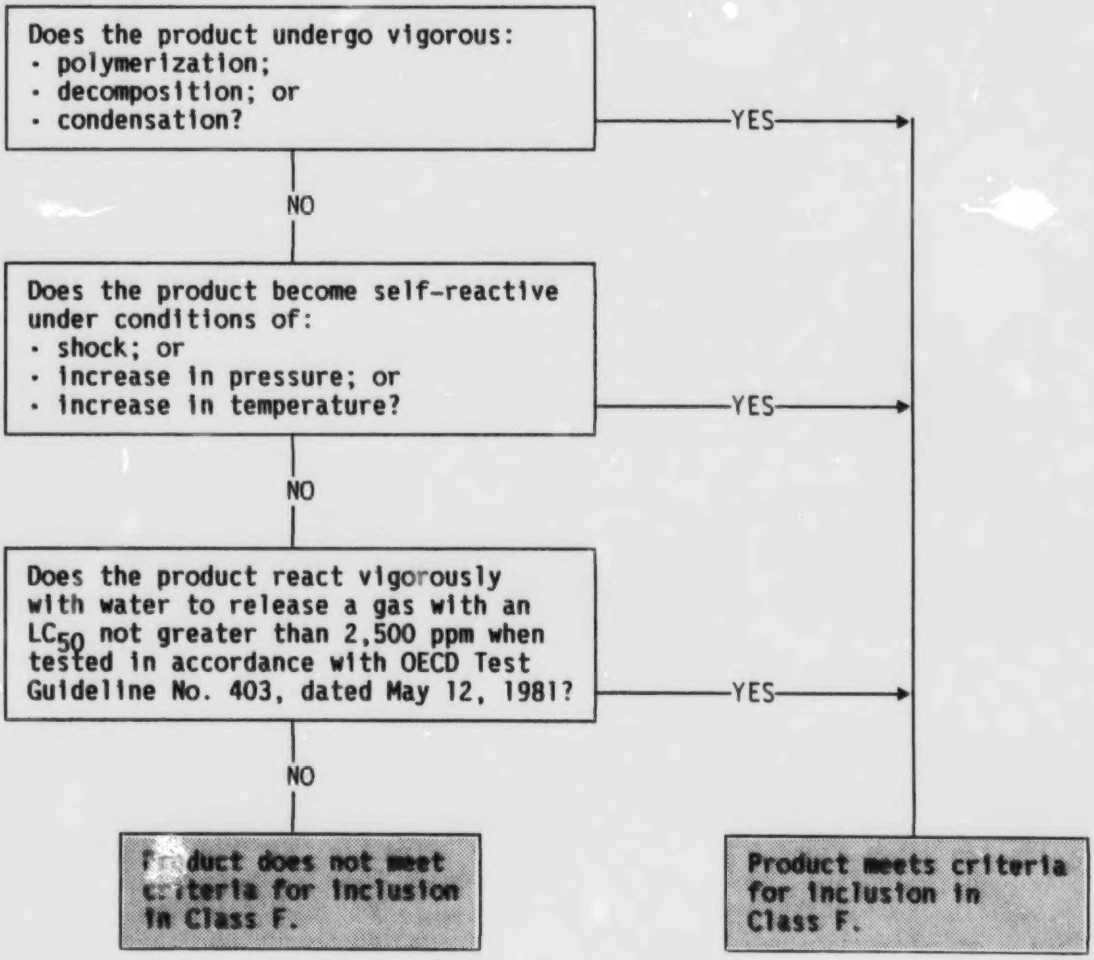
NOTE: The classification category of "Dangerously Reactive Material" must not be confused with the hazard concept of "Incompatibility". Materials which are incompatible are those which react dangerously on contact due to production of excessive heat, explosive or toxic products, etc. For example, many caustics are incompatible with acids, oxidizers incompatible with flammables, etc.

Only criterion #3 of Class F involves an incompatibility -- between a product and water. On the other hand, there are many materials which are incompatible with other products but which are not classified as Dangerously Reactive. This point must be understood when completing the MSDS item on "Incompatibility". See Chapter 4: The Material Safety Data Sheet.

FIGURE 18

DECISION TREE: CRITERIA FOR INCLUSION IN CLASS F - DANGEROUSLY REACTIVE MATERIAL

(Reference: CPR, Section 66)


Does the product undergo vigorous:
· polymerization;
· decomposition; or
· condensation?
YES
NO
Does the product become self-reactive under conditions of:
· shock; or
· increase in pressure; or
· increase in temperature?
YES
NO
Does the product react vigorously with water to release a gas with an LC50 not greater than 2,500 ppm when tested in accordance with OECD Test Guideline No. 403, dated May 12, 1981?
YES
NO
Product does not meet criteria for inclusion in Class F.
Product meets criteria for inclusion in Class F.

2.5 PRODUCTS EXCLUDED FROM THE APPLICATION OF WHMIS LEGISLATION

As discussed in Part 2.3 of this Chapter, ten types of products are excluded in whole or part from WHMIS information requirements, even when those products meet criteria for inclusion in WHMIS Classes A-F.

Categories of excluded products are:

- restricted products (i.e. products, materials or substances included in Part II of Schedule I of the Hazardous Products Act) when packaged as consumer products;
- explosives within the meaning of the Explosives Act;
- cosmetics, drugs, food and devices within the meaning of the Food and Drugs Act;
- pest control products within the meaning of the Pest Control Products Act;
- prescribed substances within the meaning of the Atomic Energy Control Act;
- wood or products made of wood;
- manufactured articles;
- tobacco or products made of tobacco;
- hazardous wastes;
- products handled or transported pursuant to the Transportation of Dangerous Goods Act.

This Part of Chapter 2 provides an explanation of the criteria used to determine if a product falls into any of these ten categories.*

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* **NOTE: Special Case (sand, gravel, etc.)**

There are certain materials that may meet the WHMIS definition of a controlled product, yet, because of their physical size or shape, would not endanger worker health or safety. Examples include sand or gravel which are likely to meet the WHMIS definition of a controlled product because of silica content, yet would not endanger worker health or safety when piled on the site of a quarry or a construction project.

It is the policy of regulatory agencies that WHMIS requirements only apply where such materials are packaged or processed for a specific purpose; for example, stone which is crushed and sized for use in abrasive cleaners.

2.5.1 CONSUMER PRODUCTS

1. Supplier Exemption

A product which is included in Part II of Schedule I of the HPA (i.e. a restricted product) and which is "packaged as a consumer product" is exempted under Section 12(f) of HPA from WHMIS requirements for a supplier label and supplier material safety data sheet. In such cases, the labelling and packaging requirements of the *Hazardous Products (Hazardous Substances) Regulations** and *Consumer Packaging and Labelling Regulations* may apply.

Of the many restricted products listed in Part 11 of Schedule I of HPA, about 15, shown in Figure 19, are likely to contain hazardous substances and be found in the workplace.

To be "packaged as a consumer product", the product must meet two conditions:

a) **It must be packaged for the consumer**; i.e. it is in the receptacle or package in which it is offered for sale and normally displayed to the consumer. Bulk deliveries are not packaged. Products displayed for sale in bulk containers and transferred to smaller containers for delivery to the customer following sale are not normally considered packaged.

b) **It must be available to the public through retail systems,**** either at outlets or on a door-to-door basis. Product sold only through wholesale outlets is not considered to be available to the consumer.

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* These regulations are being revised and will be retitled *Consumer Chemicals and Containers Regulations.*

** Consumer products are normally used by the public for personal, family or household purposes. For example, specialized adhesives meant only for high technology industrial applications are not considered to be for consumer use. For reference, "Consumer Commodity" is in part defined in the TDG Regulations to be "dangerous goods that are packaged and distributed in a quantity and concentration . . . for sale through retail sales agencies for consumption by individuals for the purposes of personal care or household use . . ."

2. Employer Exemption

Model OSH requirements do not apply to the employer with respect to material safety data sheets or a supplier label for a product packaged as a consumer product and in quantities normally used by the consuming public. However, Model OSH requirements related to workplace labels and worker education do apply in these circumstances.

Quantities normally used by the consuming public will vary from product to product. For example, a paint may normally be available to the consumer in quantities up to five gallons (23 litres); a nut-locking compound, in much smaller quantities; for example, 200 ml or less.

This exemption applies to the retail sale of such products whether or not they appear in Part II of Schedule I of HPA. Material safety data sheets will, of course, have been prepared by suppliers for controlled products which fall outside Part II of Schedule I if they are also sold in bulk or on a non-retail basis. Employers who purchase such products on a consumer basis are not required, but may wish to enquire, if data sheets are available.

Requirements for labels on restricted products sold for consumer use are provided in Appendix A of Chapter 3 of this Manual.

FIGURE 19

PRODUCTS IN SCHEDULE I, PART II, WHICH ARE LIKELY TO CONTAIN CONTROLLED PRODUCTS

Product Number In Schedule I	Product Description
1	A bleach or cleanser that contains chlorine or is a source of available chlorine and is packaged as a consumer product.
2	A product packaged as a consumer product that is:
	a) a corrosive chemical, including hydrochloric acid, sulphuric acid, sodium hydrogen sulphate, nitric acid, phosphoric acid, acetic acid, trichloroacetic acid, formic acid, lactic acid, oxalic acid and its salts, sodium hydroxide, potassium hydroxide, ammonia and ammonium hydroxide, phenol, cresol (o-, m-, p-), silver nitrate, zinc chloride and iodine, or
	b) a corrosive product which contains a corrosive chemical and has a pH of 2.5 or less or 11.5 or more before it is prepared for use for an aqueous solution or when it is prepared for use according to label directions for any other product.
3	Petroleum distillates or products containing petroleum distillates, including naphtha, mineral spirits, Stoddard solvent, kerosene, gasoline and mineral seal oil when packaged as consumer products.
4	Adhesives, cleaning solvents, thinning agents and dyes containing toluene or acetone, when packaged as consumer products.
5	Polishes, cleaning agents, liquid coating materials, paint removers and varnish removers which contain 1,1,2-trichloroethane, 1,2-dichloroethane or chloroform when packaged as consumer products.
6	Fire extinguishing fluids composed of or containing any halogenated aliphatic hydrocarbons.
7	Antifreeze preparations which contain ethylene glycol or diethylene glycol when packaged as consumer products.
8	Turpentine or products containing turpentine, including gum turpentine, steam-distilled wood turpentine, sulphate wood turpentine, and destructively distilled wood turpentine, when packaged as consumer products.
9	Methyl alcohol or products containing methyl alcohol, when packaged as consumer products.
10	Disposable metal containers of consumer products designed to release pressurized contents by use of a manually operated valve that forms an integral part of the container.
10.1	Alkyl cyanoacrylate adhesives.
11	Products used in polishing, cleaning or plating metal that contain hydrocyanic acid or salts of hydrocyanic acid, and are packaged as consumer products.
30	Paints, enamels and other liquid coatings for use on the interior or exterior surfaces of buildings, furniture or household products that contain more than 0.5 per cent by weight of lead.
33	Pine oils, including synthetic pine oils, products containing pine oils and pine wood extracts containing alpha terpineol or other terpene alcohols or a mixture of these substances with ethers and hydrocarbons.
36	Cellulose fibre for use as loose fill insulation in indoor building construction.

2.5.2 EXPLOSIVES

The Explosives Act defines an explosive as:

> "Any substance that is made, manufactured or used to produce an explosion or detonation or a pyrotechnic effect and includes gunpowder, propellant powders, blasting agents, dynamite, detonating cord, lead azide, detonators, ammunition, rockets, fireworks, safety flares or other signals."

Explosives are distinct from substances such as ethers and furans which may form explosive peroxides and picric acid which may become explosive when dry. Such products are considered controlled products within Class F, Dangerously Reactive Material.

Requirements for labels required with the manufacture and sale of explosives are described in Chapter 3 of this Manual.

2.5.3 COSMETICS, DRUGS, FOODS AND DEVICES

Of the four types of products legislated by the Food and Drugs Act, cosmetics and drugs are the most likely to contain controlled products.* The Act defines these products as:

Cosmetic: Any substance or mixture of substances manufactured, sold or represented for use in cleansing, improving or altering the complexion, skin, hair or teeth, and includes deodorants or perfumes.

Drug: Includes any substance or mixture of substances manufactured, sold or represented for use in:

- the diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state, or the symptoms thereof, in man or animal;
- restoring, correcting or modifying organic functions in man or animal; or

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* The Act considers food to be "any article . . . for use as food or drink for man, chewing gum and any ingredient that may be mixed with food . . ." A device is "any article, instrument, apparatus or contrivance . . . for use in the diagnosis, treatment . . . or prevention of a disease, restoring . . . body function, the diagnosis of pregnancy . . . or care . . . during pregnancy and at and after birth . . ."

Where a product ordinarily considered a food has a non-food use in the workplace, it is not excluded from WHMIS as a food product. For example, flour, which is a respiratory tract sensitizer, would fall within WHMIS Class D if sold and used as an additive to an industrial filler.

- disinfection in premises in which food is manufactured, prepared or kept.

Three criteria help distinguish between products used in the cosmetic and drug industries that are subject to the Food and Drugs Act and those which must meet WHMIS supplier information requirements.

- All drugs are issued with Drug Identification Numbers (DIN's) which must appear on the label. Health and Welfare Canada maintains lists of drugs available in Canada and their ingredients in the publication Canadian Drug Identification Code. The Council of the Pharmaceutical Society of Great Britain provides a summary of the properties, actions and uses of most drugs in clinical use throughout the world in the publication Martindale, The Extra Pharmacopeia. (There is no equivalent list of cosmetics available in Canada. Cosmetics manufacturers are, with few exceptions, not required to divulge information on ingredients in formulations. The Bureau of Non-Prescription Drugs, Health and Welfare Canada, 355 River Road, Vanier, Ontario, K1A 1B8, administers the Cosmetic Regulations.)

- Cosmetics and drugs are defined in terms of being sold or represented for specific purposes. A controlled product sold as a drug or cosmetic would be subject to WHMIS supplier requirements if sold for a different use. For example, the chemical 2,4-diaminoanisole is excluded from WHMIS supplier requirements when sold in hair dye formulations but is included when used as a fur dye.

- Cosmetics and drugs are usually products which are applied on or taken into the body. A hair dye is a cosmetic but the formaldehyde solution used to disinfect a hair brush is not. Antineoplastic agents are drugs but disinfectants for hypodermic syringes are not.

  NOTE: The exception to this rule is the use of a drug for disinfection in premises in which food is manufactured, prepared or kept. A disinfectant which is expressly labelled for use in such locations and has a DIN number is a drug. (In addition, some disinfectants are excluded from WHMIS supplier requirements because they are either restricted products meant for consumer use [see Section 2.5.1] or are pest control products [see Section 2.5.4].)

Label requirements for the supply of cosmetics and drugs are described in Chapter 3 of this Manual.

2.5.4 PEST CONTROL PRODUCTS

Under the Pest Control Products Act, a pest is "any injurious, noxious or troublesome insect, fungus, bacterial organism, virus, weed, rodent or other plant or animal pest, and includes any injurious, noxious or troublesome organic function of a plant or animal."

In turn, a pest control product is "any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest, and includes:

a) Any compound or substance that enhances or modifies or is intended to enhance or modify the physical or chemical characteristics of a control product to which it is added, and

b) Any active ingredient used for the manufacture of a control product."

Substances in category (a) include stickers, spreaders, adjuvants and emulsifiers which are not primarily responsible for the control effect of the product but enhance or modify that effect. Category (a) does not include products which do not alter effect ("non-active" ingredients), such as various solvents, diluents and products intended to adjust pH. Examples of non-actives include asbestos, benzene, formaldehyde, free silica, lead compounds, toluene and toluene diisocyanate.

Active ingredients in category (b) are the substances which cause the effect of the control product (for example, the insecticide parathion, the herbicide glyphosate and the fungicide pentachlorophenol) and synergists such as piperonyl butoxide.

Pest control products are, like cosmetics and drugs, defined in terms of intent for use. Any controlled product used in a pesticide, but manufactured and intended for another use, is subject to all WHMIS information requirements. For example, Stoddard solvent is used as a herbicide but has a variety of other industrial applications as a solvent and cleaning agent. WHMIS label and data sheet requirements also apply to containers of "non-active" controlled products at pesticide manufacturing and formulation facilities prior to their inclusion in control products.

Pest control products require registration numbers unless exempted for reasons that the product is:

- imported for the importer's use, does not exceed one pound by weight or one pint by volume and does not have a monetary value more than $10;
- used for research purposes;

- used for seed treatment; or is
- used for cleansing purposes.

Labels of registered pesticides are available on microfiche from Icon Microfilm Ltd., 1675 Russell Road, Ottawa, Ontario, K1G 0N1. Agriculture Canada may, on request, provide lists of registered products. Labels required for the sale of pest control products are described in Chapter 3 of this Manual.

2.5.5 RADIOACTIVE PRESCRIBED SUBSTANCES

Under the Atomic Energy Control Act, a prescribed substance means:

> "Uranium, thorium, plutonium, neptunium, deuterium, their respective derivatives and compounds and any other substances that the Atomic Energy Control Board may by regulation designate as being capable of releasing atomic energy or as being requisite for the production, use or application of atomic energy."

Lists of radioactive substances pursuant to this definition are provided in the schedules to the Atomic Energy Control Regulations and the Transport Packaging of Radioactive Materials Regulations. Chapter 3 of this Manual provides a summary of labelling requirements pursuant to those regulations.

2.5.6 WOOD OR PRODUCTS MADE OF WOOD

Wood is composed of cellulose fibre, hemicellulose, lignin and various sugars. Products are made of wood if they are composed entirely or in large measure of wood, but they need not be manufactured in the specific shape or design of their intended use. Examples include lumber of all sizes, laminated beams, plywood, chipboard, particleboard, wood chips, sawdust and such products which have been coated with paints or preservatives.

If a product is made from one or more chemical components of wood, but lacks the properties of wood; for example, pulp, paper,* turpentine and tall oil, it is not considered to be a product made of wood.

At facilities where specialized products made of wood are manufactured, additives such as adhesive, paints and preservatives are subject to all applicable WHMIS information requirements prior to their addition to the finished product.

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* Paper is considered to be a manufactured article. See Section 2.5.7.

2.5.7 MANUFACTURED ARTICLES

A manufactured article is any article which meets three conditions:

1. it is formed to a specific shape or design during manufacture;
2. its intended use when in that form depends in whole or in part on its shape or design as manufactured; and
3. under normal conditions of use it will not release or otherwise cause a person to be exposed to a controlled product.

The following interpretations are to be used:

- **Shape, design and form** refer to the external outline and contours of the product rather than to the material of which it is made.
- **Normal conditions of use** means normally expected conditions in which the product is in the state of being employed for its purpose. "Normal conditions of use" is intended to exclude releases of a controlled product that may occur during the installation or maintenance of an article which meets criteria 1 and 2 or that occur if the article is abused.
- **To be exposed to a controlled product** means to be exposed to a controlled product present in the manufactured item, rather than to decomposition products, by-products, etc. formed and released during the use of the product.*

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* If a controlled product is an article but is not exempt under the manufactured article exemption because it releases, under normal conditions of use, a controlled product, the hazard information and ingredient disclosure requirements must relate only to those ingredients that are controlled products and that are released under normal conditions.

In addition, hazardous decomposition products and hazardous combustion products of which the supplier is aware or ought reasonably to be aware that are released during normal use of articles which are controlled products must be identified on the MSDS. The supplier is not expected to give toxicological data on probable releases that are not ingredients of the product.

If a controlled product under normal conditions of use (e.g. the product is intended to be cut, melted or heated) releases hazardous chemicals of which the supplier is not certain, he must provide general warnings about possible toxic releases (CPR, Section 12[11] requires on an MSDS any other hazard information with respect to the controlled product of which the supplier is aware or ought reasonably to be aware). See Chapter 4, The Material Safety Data Sheet, for further information.

Examples of Application of the Manufactured Articles Exclusion

- Welding rods are not manufactured articles because, although formed to a specific design, during use they release controlled products previously contained in the rods.
- Piping, whether made of mild, galvanized or stainless steel, is a manufactured article because it does not release air contaminants during its intended use of conveying fluids from one point to another.
- Sheets of friction materials which contain asbestos and which are manufactured with the intent of later being cut or shaped to form specific friction products are not manufactured articles.
- Specific friction products which contain asbestos, such as brake shoes fitted with pre-arced linings, disc brake pads and clutch friction plates are manufactured articles. While workers may be exposed to asbestos fibres during installation or maintenance of these articles, exposure is not likely during their use for the purposes of braking or engaging moving parts. For the protection of workers, non-WHMIS right-to-know regulations must be used.
- A cylinder produced for the purposes of containing acetylene is a manufactured article. Once filled with acetylene, however, it becomes a container for a controlled product and, when sold as such, must be provided with labels and data sheets in conformity with WHMIS requirements.
- A refrigerator is a manufactured article made up of various components including a system for containing compressed gases. Unlike the compressed gas cylinder, the refrigerator is not considered to be a container of a controlled product.

2.5.8 TOBACCO OR PRODUCTS MADE OF TOBACCO

Products made of tobacco include cigarettes, cigars, chewing tobaccos and snuffs. Requirements for the labelling of these products are found in the Tobacco Products Control Act administered by Health and Welfare Canada.

Chemical components of tobacco which lack the characteristics of tobacco; for example, nicotine, are not considered to be products made of tobacco.

2.5.9 HAZARDOUS WASTES*

A hazardous waste is defined in WHMIS as a "controlled product that is intended for disposal or is sold for recycling or recovery." Examples of wastes include various solid and liquid materials such as waste insulation in asbestos removal projects, the contents of tailing ponds or sewage systems, and products for recycling, such as used engine oils. A byproduct of a production process such as black liquor in the pulping process which is recycled or otherwise used on site is not a hazardous waste. A byproduct which is supplied to a party off site for use as is (i.e. is not subjected to a conversion process such as recycling or recovery) is not a hazardous waste.

The definition of a hazardous waste implies an intent to manage or handle the product. In that sense, **a hazardous waste is different from a fugitive emission which is defined in the Model OSH Regulations as a "gas, liquid, solid, vapour, fume, mist, fog or dust that escapes from process equipment, from emission control equipment or from a product."** Fugitive emissions include stack emissions, leaks from corroded process equipment, release of asbestos fibre from friable insulation, etc.

Under Model OSH Regulations, an employer must ensure workers are instructed in safe procedures for the disposal of a product and in procedures to be followed where fugitive emissions are present.

In addition, when hazardous wastes are produced on site, the employer must take additional steps to ensure worker safety through a combination of any means of identifying the waste (such as placards, coded labels, workplace labels, etc.) and worker education. For example, WHMIS requires that the service station owner identify a barrel of used oil at the service station or that an asbestos removal firm identify the contents of containers of waste insulation at the asbestos removal site. However, identification is not required by WHMIS at the oil recycling depot to which the oil is sent or the hazardous waste disposal site where the asbestos waste is received.

The identification of wastes during transport is subject to applicable TDG and provincial regulations, the identification and handling at waste disposal or recycling sites; by applicable environmental and non-WHMIS safety and health regulations. The Environment Canada publication, User's Guide to Hazardous Waste Classification explains procedures for classifying hazardous wastes.

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* Refer to MR53/88 "Workplace Health Hazard" Regulation.

2.5.10 PRODUCTS HANDLED OR TRANSPORTED PURSUANT TO THE TRANSPORTATION OF DANGEROUS GOODS (TDG) ACT

TDG and WHMIS are complementary information systems. TDG covers information requirements on products in the course of shipment to or from workplaces whereas WHMIS applies to products within workplaces. No overlap is intended. One system takes over where the other leaves off.

Workers are most likely to be exposed to dangerous goods in transit during emergency, short-term circumstances such as vehicle accidents and spills. TDG requirements deal with acute exposure information and the use of symbol alerts on labels and placards.

Worker exposure to controlled products in the workplace can occur in a wider variety of circumstances and over longer periods of time. WHMIS requirements are more extensive than TDG and include the use of explicit labels and material safety data sheets.

Dangerous goods under TDG include any product, substance or organism listed in Schedule II of the Transportation of Dangerous Goods Regulations or that are otherwise classified as dangerous goods through the application of the criteria described in Part III of those regulations.

The TDG Act and Regulations apply to the handling, offering for transport and transportation of dangerous goods except in the circumstances described in Part II of the TDG Regulations; for example:

- goods under the sole direction of the Minister of National Defence;
- transport of oil or gas by pipeline where governed by appropriate federal or provincial legislation;
- transport of goods, other than explosives and radioactive substances, solely within the confines of the manufacturing or processing facility if public access to the facility is controlled;
- bulk transport of goods within the meaning of the Canada Shipping Act; and
- transport of specific goods listed in subparagraphs (i) to (xxx) of Section 2.3 of the TDG Regulations.

The following interpretations will help assist to determine where TDG requirements apply.

- **"Handling and offering for transport"** refer to activities such as assembling, packaging, storing, loading and unloading for transport. For example, WHMIS does not apply to products while in temporary storage in a distribution warehouse. (At workplaces other than those operated solely as trans-shipment points, WHMIS materials such as the MSDS will normally be available in the area where such activities occur.)
- **"Storing for transport"** is storage in which goods will not be handled any further at the workplace other than to load goods directly onto a transport vehicle for the purposes of removal from the workplace.
- **"Transportation"** generally means to and from workplaces. WHMIS applies to all circumstances where goods are transported from one point to another within a workplace, except for radioactive substances and explosives, in which case TDG applies.

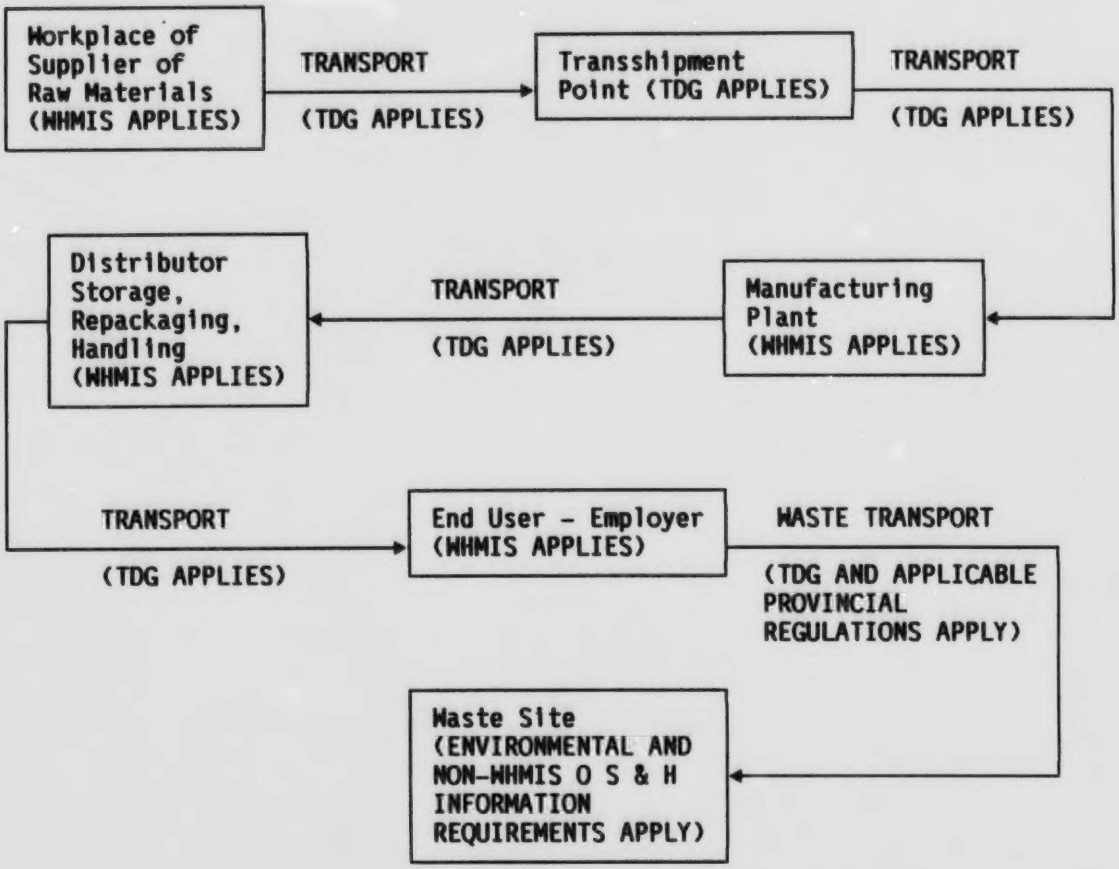
The exemption for products being transported means that an employer of workers who transport controlled products does not have to provide WHMIS labels, material safety data sheets or education to drivers of vehicles transporting controlled products. However, if the driver is exposed to the controlled product by being actively involved in the loading or unloading of the product (for example, an oil or gasoline truck), the driver should have access to the data sheet at the point of loading or unloading, and should undergo training as outlined in Chapter 5, "Worker Education".

Figure 20 provides an outline of how WHMIS and TDG information requirements generally apply to the flow of goods through commerce. In Figure 20, in circumstances where TDG applies between the points of product supply and use, WHMIS labels will, subject to exemptions (e.g. bulk shipment, outer containers if inner containers bear a WHMIS symbol), be applied to containers of controlled products. However, WHMIS requirements are meant to apply at points of sale or use rather than during shipment.

The next Part (2.6) of this Chapter provides a comparison of the classification systems of WHMIS and TDG. Further information on the comparison of WHMIS and TDG labels is found in Chapter 3, "The Label".

FIGURE 20

SEQUENCE OF APPLICATION OF WHMIS AND TDG INFORMATION REQUIREMENTS AS GOODS FLOW THROUGH COMMERCE


Workplace of Supplier of Raw Materials (WHMIS APPLIES)
TRANSPORT
(TDG APPLIES)
Transshipment Point (TDG APPLIES)
TRANSPORT
(TDG APPLIES)
Manufacturing Plant (WHMIS APPLIES)
TRANSPORT
(TDG APPLIES)
Distributor Storage, Repackaging, Handling (WHMIS APPLIES)
TRANSPORT
(TDG APPLIES)
End User - Employer (WHMIS APPLIES)
WASTE TRANSPORT
(TDG AND APPLICABLE PROVINCIAL REGULATIONS APPLY)
Waste Site (ENVIRONMENTAL AND NON-WHMIS O S & H INFORMATION REQUIREMENTS APPLY)

2.6 COMPARISON OF CLASSIFICATION SYSTEMS - WHMIS AND TDG

The means of classification in WHMIS and TDG are similar but not identical. The comparison between the two systems is discussed in two parts:

- General Comparison of Classification Categories
- Detailed Comparison of Classification Criteria

2.6.1 GENERAL COMPARISON OF CLASSIFICATION CATEGORIES

Figure 21 provides an overview of Classes and Divisions used in the two systems.

1. Terminology

- Both systems use the same terms to describe major categories, i.e. "Class" and "Division". However, WHMIS uses letter designations (A-F) for Classes; TDG uses number designations (1-9).
- In WHMIS Class D - Poisonous and Infectious Material, the term "Subdivision" -- either "Subdivision A - Very Toxic Material" or "Subdivision B - Toxic Material" -- is used to describe categories within Divisions. TDG uses the term "Packing Group", and the Packing Group Categories I, II, III to describe decreasing levels of hazard, either within Classes (for Class 3 - Flammable Liquids and Class 8 - Corrosives) or within a Division (Division 1 of Class 6 - Poisonous Substances).
- The means of abbreviating reference to the categories into which a product is assigned is different for the two systems. WHMIS uses hyphens; TDG uses decimals.

For example, if a product is assigned to WHMIS Class D, Division 2, Subdivision A, the designation is abbreviated as D-2A. If the same product is assigned to TDG Class 6, Division 1, the designation is 6.1.

2. Types of Categories

a) Similarities

- Five of the six Classes in WHMIS have comparable Classes in TDG.

WHMIS CLASS	is comparable to	TDG CLASS
A - Compressed Gases		2
B - Flammable and Combustible Material		2.1, 3, 4
C - Oxidizing Material		5
D - Poisonous and Infectious Material		6
E - Corrosive Material		8

FIGURE 21

CLASSES AND DIVISIONS WITHIN WHMIS AND TDG - AN OVERVIEW

WHMIS		TDG	
		CLASS 1	EXPLOSIVES Divisions 1-5 differentiated on the basis of hazard
CLASS A	COMPRESSED GASES	CLASS 2	COMPRESSED GASES Division 1: Flammable Gases Division 2: Non-flammable, Non-toxic, Non-corrosive Gases Division 3: Poisonous Gases Division 4: Corrosive Gases
CLASS B	FLAMMABLE AND COMBUSTIBLE MATERIAL Division 1: Flammable Gases Division 2: Flammable Liquids Division 3: Combustible Liquids Division 4: Flammable Solids Division 5: Flammable Aerosols Division 6: Reactive Flammable Materials	CLASS 3	FLAMMABLE LIQUIDS Divisions 1-3 differentiated on the basis of flashpoint and form of transport
		CLASS 4	FLAMMABLE SOLIDS, SPONTANEOUSLY COMBUSTIBLE, DANGEROUS WHEN WET Division 1: Flammable Solids Division 2: Substances Liable to Spontaneous Combustion Division 3: Substances Which Emit Flammable Gases on Contact with Water
CLASS C	OXIDIZING MATERIAL	CLASS 5	OXIDIZING SUBSTANCES AND ORGANIC PEROXIDES Division 1: Oxidizing Substances Division 2: Organic Peroxides
CLASS D	POISONOUS AND INFECTIOUS MATERIAL Division 1: Materials Causing Immediate and Serious Toxic Effect Division 2: Materials Causing Other Toxic Effects Division 3: Biohazardous Infectious Material	CLASS 6	POISONOUS AND INFECTIOUS SUBSTANCES Division 1: Poisonous Substances Division 2: Infectious Substances
		CLASS 7	RADIOACTIVE MATERIALS
CLASS E	CORROSIVE MATERIAL	CLASS 8	CORROSIVES
CLASS F	DANGEROUSLY REACTIVE MATERIAL	CLASS 9	MISCELLANEOUS PRODUCTS OR SUBSTANCES Division 1: Miscellaneous Dangerous Goods Division 2: Environmentally Hazardous Substances Division 3: Dangerous Wastes

b) Differences

- TDG has two Classes for which there is no equivalent in WHMIS; i.e.:
  - Explosives (Class 1); and
  - Radioactive Materials (Class 7).
- WHMIS has four categories for which there is no equivalent category in TDG; i.e.:
  - WHMIS Class B-3 - Combustible Liquids
  - WHMIS Class B-5 - Flammable Aerosols
  - WHMIS Class D-2 - Materials Causing Other Toxic Effects
  - WHMIS Class F - Dangerously Reactive Material
- All WHMIS Classes have specific descriptions; whereas TDG Class 9 is termed "Miscellaneous Products or Substances".
- WHMIS covers Flammable and Combustible Material within one Class (Class B); TDG covers such materials in three Classes (Class 2, Division 1 - Flammable Gases; Class 3 - Flammable Liquids; and Class 4, Division 1 - Flammable Solids).
- WHMIS covers poisonous materials within one Class (Class D - Poisonous and Infectious Materials); TDG covers such materials in three Classes (Class 2, Division 3 - Poisonous Gases; Class 6 - Poisonous and Infectious Substances; and Class 9 - Miscellaneous Products or Substances).

2.6.2 DETAILED COMPARISON OF CLASSIFICATION CRITERIA

In this Part, the classification criteria for each Class, Division and Subdivision in WHMIS are compared to those within TDG legislation. Figure 22 provides a summary of the information in this Part.

1. CLASS A - COMPRESSED GAS

(Reference: CPR, Section 34)

WHMIS criteria for inclusion in this Class are basically the same as those for TDG Class 2 with respect to a compressed gas only (see TDG Regulations, Section 3.10). WHMIS does not, however, establish Divisions within Class A, unlike TDG which creates four Divisions (Flammable Gases, Poisonous Gases, Corrosive Gases and Other Gases - see TDG Regulation 3.11).

2. CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL

a) CLASS B, Division 1: Flammable Gases

(Reference: CPR, Section 36)

WHMIS criteria for this Division, based on the upper flammable limit and flammable range of the product, are identical to those for TDG Class 2, Division 1 (see TDG Regulations, Section 3.11[a]).

b) CLASS B, Division 2: Flammable Liquids

(Reference: CPR, Section 37 and Schedule IV)

The WHMIS criterion for inclusion (liquids with a flashpoint of less than 37.8°C) is identical to that for TDG Class 3, where the shipment of liquid is within Canada (see TDG Regulations, Section 3.13[a],[b],[c][ii]). However, if the product is consigned for international air or marine transport, TDG extends the flashpoint for inclusion in Class 3 to 60.5°C and 61°C respectively (see TDG Regulations, Sections 2.9 and 3.13[c][i]).

There is no WHMIS equivalent to the three Divisions or Packing Groups of flammable liquids found in TDG Class 3.

c) CLASS B, Division 3: Combustible Liquids

(Reference: CPR, Section 38 and Schedule IV)

In WHMIS, a combustible liquid has a flashpoint of at least 37.8°C (100°F) but not more than 93.3°C (200°F). There is no equivalent TDG classification. As discussed in WHMIS Class B, Division 2, some combustible liquids are designated as Flammable under TDG Regulations when consigned for shipment out of country by air or marine transport.

d) CLASS B, Division 4: Flammable Solids
(Reference: CPR, Section 39 and Schedule V)

Two WHMIS criteria for assignment to this Division (see CPR, Section 39[a],[b]) are identical to those for TDG Class 4, Division 1 (see TDG Regulations, Sections 3.15[a] and 3.16[a]). However, WHMIS also includes solids which meet the criteria of a flame spread test (see CPR, Section 39[c] and Schedule V). There is no equivalent TDG test criterion.

e) CLASS B, Division 5: Flammable Aerosols
(Reference: CPR, Section 40 and Schedule VI)

There is no equivalent TDG criterion to this WHMIS Division. However, under TDG, some aerosols with more than specified quantities of flammable, poisonous or corrosive materials are assigned to various TDG Classes (see TDG Regulations, Schedule II, List II under "AEROSOLS").

f) CLASS B, Division 6: Reactive Flammable Materials
(Reference: CPR, Section 41)

This Division covers materials which are spontaneously combustible in contact with air or water under normal conditions of use and those which emit flammable gas on contact with water or water vapour. The equivalent TDG classification is Class 4, Divisions 2 and 3 (see TDG Regulations, Sections 3.15[b],[c] and 3.16[b],[c]).

3. CLASS C - OXIDIZING MATERIAL
(Reference: CPR, Section 42)

This Class covers oxidizers and organic peroxides and is identical to TDG, Class 5 (see TDG Regulations, Sections 3.17, 3.18). However, WHMIS does not establish Divisions within Class C, unlike TDG, which creates a Division for each of Oxidizing Substances and Organic Peroxides.

4. CLASS D - POISONOUS AND INFECTIOUS MATERIAL
(References: CPR, Sections 33, 43-64)

Class D is the most complex Class in WHMIS and is far more comprehensive than the equivalent TDG Class 6 - Poisonous and Infectious Substances.

The major difference between the two systems is that TDG criteria are limited to acute lethality data whereas WHMIS includes consideration of chronic toxic effects, carcinogenic, reproductive and teratogenic effects, sensitization, eye and skin irritation and mutagenicity. Class D has three Divisions.

a) CLASS D, Division 1: Materials Causing Immediate and Serious Toxic Effects
(Reference: CPR, Sections 43-51)

Criteria for assignment to this Division are based on acute lethality data and are roughly equivalent to those for TDG Class 6, Division 1 - Poisonous Substances (see TDG Regulations, Sections 3.20-3.23).

However, there are a number of differences between the two systems; for example:

- WHMIS acute lethality criteria reference OECD Test Guidelines; TDG criteria do not reference any standard test method.
- WHMIS inhalation acute lethality criteria are based on four-hour exposure periods; TDG criteria on one-hour exposures.
- WHMIS criteria provide for assignment of untested mixtures into Division 1 on the basis of lethalities of ingredients present in a concentration of one per cent or more; TDG does not use any concentration cutoffs.
- Formulae in WHMIS for the calculation of equivalent lethalities of untested mixtures where lethalities are known for one or more ingredients are similar, but not identical to those issued in TDG Regulations (SOR 85-77, 18 January 1985). **NOTE: Proposed revisions to the TDG Regulations will make TDG formulae identical to those in WHMIS.**
- WHMIS establishes two Subdivisions within Division 1 (Subdivision A - Very Toxic Material and Subdivision B - Toxic Material), whereas TDG defines three Packing Groups - I, II, III in order of decreasing hazard. A criterion of assignment of a product to WHMIS Subdivision A is the assignment to TDG Packing Groups I or II; to Subdivision B, assignment to Packing Group III.

b) CLASS D, Division 2: Materials Causing Other Toxic Effects
(Reference: CPR, Sections 33, 52-63)

WHMIS Division 2 covers criteria related to chronic toxic effects, carcinogenic, reproductive and teratogenic effects, sensitization, eye and skin irritation and mutagenicity. There is no equivalent category in TDG.

Several types of products which meet the criteria of this Division are covered in TDG Class 9 - Miscellaneous Dangerous Goods; for example, asbestos, PCB's and various pesticides.

c) CLASS D, Division 3: Biohazardous Infectious Materials
(Reference: CPR, Section 64)

The wording of CPR Section 64 is similar to that for the equivalent TDG Class 6, Division 2 - Infectious Substances (see TDG Regulations 3.19[f] and 3.20[b]).

However, TDG has adopted a system for determining assignment to its Division 2 in Schedule VII to the TDG Regulations which is different from the WHMIS policy described in this Manual (see Part 2.4.6[3]). The WHMIS approach is based on hazard (risk) categories of the World Health Organization and assignment of microorganisms within those categories by agencies such as the Medical Research Council of Canada and Health and Welfare Canada.

5. CLASS E - CORROSIVE MATERIAL
(Reference: CPR, Section 65)

Class E covers products which are included in TDG in either:

- Class 2, Division 4 - Corrosive Gases (see TDG Regulations, Section 3.11[c]); or
- Class 8 - Corrosives (see TDG Regulations, Section 3.25).

6. CLASS F - DANGEROUSLY REACTIVE MATERIAL
(Reference: CPR, Section 66)

Class F covers products which undergo vigorous polymerization, decomposition or condensation; become self-reactive under adverse physical conditions; or which react vigorously with water to produce a very toxic gas meeting the criteria in CPR, Section 46(c).

There is no equivalent Class in TDG.* Explosives under TDG Class 1 are not equivalent to products included in WHMIS Class F.

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* Although there is no equivalent TDG Class, Section 7.5 of the TDG Regulations requires that dangerous goods which are liable to decompose, polymerize, evolve dangerous levels of heat or gas or otherwise react dangerously must be stabilized by refrigeration or other means. Regulations reference the SADT (Self Accelerating Decomposition Test) as published in Recommendations on the Transport of Dangerous Goods (United Nations) for the determination of whether non-refrigerated means of inhibition are required. For example, picric acid, which is a dangerously reactive material, cannot be transported in less than 30% water. It is assigned to TDG Class 4.1.

FIGURE 22

CLASSES AND DIVISIONS WITHIN WHMIS AND TDG - A DETAILED SUMMARY

Type of Hazard	WHMIS Class	WHMIS Class and Division Designation	TDG Class and Division Designation	Comments
Compressed Gas	Compressed Gas	Class A	Class 2, Div. 2	Essentially identical criteria.
Flammable Gas	Flammable & Combustible Material	Class B, Div. 1	Class 2, Div. 1	Identical criteria.
Flammable Liquid	Flammable & Combustible Material	Class B, Div. 2	Class 3	Equivalent criteria.
Combustible Liquid	Flammable & Combustible Material	Class B, Div. 3	--	Generally not covered by TDG.
Flammable Solid	Flammable & Combustible Material	Class B, Div. 4	Class 4, Div. 1	Equivalent criteria.
Flammable Aerosol	Flammable & Combustible Material	Class B, Div. 5	Class 2, Div. 1	Criteria unique to WHMIS, but equivalent products are listed in TDG.
Reactive Flammable Material	Flammable & Combustible Material	Class B, Div. 6	Class 4, Div. 2 & 3	Equivalent criteria.
Oxidizers	Oxidizing Material	Class C	Class 5	Identical criteria.
Acute Lethality	Poisonous & Infectious Material	Class D, Div. 1	Class 6, Div. 1	Equivalent criteria (TDG referenced in CPR).
Toxic Gas	Poisonous & Infectious Material	Class D, Div. 1	Class 2, Div. 3	Equivalent criteria.
Other Toxic Effects*	Poisonous & Infectious Material	Class D, Div. 2	--	Not covered by TDG.
Biohazardous Infectious Material	Poisonous & Infectious Material	Class D, Div. 3	Class 6, Div. 2	Equivalent regulatory statements in WHMIS and TDG.
Metal and Skin Corrosives	Corrosive Material	Class E	Class 8	Includes equivalent criteria (TDG referenced in CPR).
Corrosive Gas	Corrosive Material	Class E	Class 2, Div. 4	Equivalent criteria (TDG referenced in CPR).
Dangerously Reactive Material	Dangerously Reactive Material	Class F	--	Some are covered by TDG under other hazard Classes.
Miscellaneous Materials	No equivalent WHMIS Class	--	Class 9	This "catch-all" Class addresses primarily environmental concerns. WHMIS covers some of these materials (e.g. asbestos, PCB's) in Class D.
Explosives	Not covered by WHMIS	--	Class 1	Covered by Explosives Act and TDG Act.
Radioactive Materials	Not covered by WHMIS	--	Class 7	Covered by Atomic Energy Control Act and TDG Act.

* Includes: Skin and Eye Irritation; General Chronic Toxicity (target organ effects); Respiratory Tract Sensitization; Mutagenicity; Carcinogenicity; Teratogenicity/Embryotoxicity; Reproductive Toxicity; and Skin Sensitization.

This figure is based on materials provided by the Environmental and Occupational Toxicology Division, Health Protection Branch.

APPENDIX A

CLASSIFICATION WORKSHEETS AND A CASE EXAMPLE OF CLASSIFICATION

Appendix A provides examples of worksheets which may be of use when carrying out classification procedures, and a case example of the hypothetical product, XYZ Cleaner.

The two worksheets are:

- **Worksheet for Product Data Collection and Classification**: A ten-page worksheet which provides a means of listing information useful for both classification and completion of the material safety data sheet.
- **Product and Ingredient Information Summary Sheet**: A one-page sheet which provides a means of listing the classification characteristics of either the product as a whole or the ingredients in it.

Both the worksheets and case example are derived from educational materials developed by the Canadian Manufacturers' Association and Canadian Chemical Producers' Association for the training manual Workshop Materials for Seminars on Implementing the Workplace Hazardous Materials Information System, CMA/CCPA, 1987. Thanks are expressed to both agencies for their permission to draw from these materials.

APPENDIX A.1

WORKSHEET FOR PRODUCT DATA COLLECTION AND CLASSIFICATION

Ten-page worksheet for the detailed listing of product information, for the purposes of both classification and completion of the material safety data sheet.

WORKSHEET FOR PRODUCT DATA COLLECTION AND CLASSIFICATION

PRODUCT IDENTIFICATION

Trade Name: ______________________________

Synonyms: ______________________________

____

Plant Code: ______________________________

Chemical Name: ______________________________

Mol. Formula: ______________ Mol. Wt.: ______________

Generic Name: ______________________________

Product Use(s): ______________________________

____

Manufacturer/Supplier:

Name: ______________________________

Address: ______________________________

Street

____

City Province Postal Code

Regular Phone: ______________ Emergency Phone: ______________

SHIPPING INFORMATION - TDG REGULATIONS

Shipping Name: ______________________________

PIN (UN/NA): ______________________________

Regulated Class, Division, & Packing Group: ______________

____

INGREDIENT SUMMARY
(List all Ingredients)

No.	Ingredient Name	CAS No.	NA or UN No.	% wt. or Range	TDG Classification	WHMIS Classification	LD50 or LC50 Species/ Route/Time	MSDS Disclosure Y/N *	Trade Secret Y/N**

*On the basis of % wt. concentration.
**On the basis of claims for exemption filed with HMIRC.

PHYSICAL DATA ON PRODUCT

Ref.

Boiling Point: ______________________________ ______

Freezing/Melting Point: ______________________________ ______

Specific Gravity : ______________________________ ______

Vapour Pressure - at 20°C: ______________________________ ______

- other: ______________________________ ______

Vapour Density (air=1): ______________________________ ______

Solubility in Water: ______________________________ ______

% Volatiles: ______________________________ ______

Evaporation Rate vs. ____: ______________________________ ______

pH: ______________________________ ______

Oil/Water Dist. Coefficient: ______________________________ ______

Odour Threshold Conc.: ______________________________ ______

Appearance (Physical State and Colour): ______________________________ ______

Odour: ______________________________ ______

FIRE AND EXPLOSION DATA (on Product)

Ref.

Flash Point and Method: ______________________________ ______

Auto-ignition Temperature: ______________________________ ______

Flammable Limits in Air: % by Volume

Lower Flammable Limit (LFL) __________

Upper Flammable Limit (UFL) __________

Ref.

Fire and Explosion Hazards: ______

______ Flammable Liquid
______ Flammable Gas
______ Flammable Solid
______ Combustible Liquid
______ Dangerous when Wet
______ Catches Fire if Exposed to Air
______ Flammable Aerosol
______ Sensitive to Static Discharge
______ Sensitive to Impact
______ Forms Peroxides
______ Peroxides Concentrate on Evaporation
______ Other (specify) ______________________________
____

Extinguishing Media: ______

______ Water
______ Chemical Foam
______ Dry Chemical
______ CO_2
______ Sand/Dirt
______ Other (specify) ______________________________
____

Special Fire Fighting Instructions: ______

______ Respiratory Protection (specify) ______________________
____

______ Flood with Water
______ Use Water Spray
______ Allow to Burn
______ Cool Container with Water
______ DO NOT use Water
______ Other (specify) ______________________________
____

Hazardous Combustion Products: ______

______ Specify ______________________________
____

Ref.

Oxidizing Material: ______

______ Causes or Contributes to Combustion of Other Material by Yielding Oxidizer

______ Organic Peroxide

TOXICOLOGICAL AND HEALTH DATA

Ref.

Recommended Exposure Limit: ______

Acute Lethality: LD50 (route/species) ______
LC50 (time/species)

Subchronic ______

Carcinogenicity Data: NTP ______
IARC
ACGIH

Reproductive Data: ______

Mutagenicity Data: ______

Teratogenicity Data: ______

Other Materials which act Synergistically with Product to Cause Toxic Effects: probable routes of entry to body (skin/inhalation/ingestion/eyes) ______

Effects of Exposure when:

Inhaled (corrosion/sensitization/irritation/other): ______

- Acute
- Chronic

Ref.

In Contact with the Skin: ______
(corrosion/sensitization/irritation/defatting/other):

- Acute
- Chronic

Skin Absorption: Yes ☐ No ☐ ______

In Contact with the Eyes (corrosion/irritation/other): ______

Ingested: ______

Other Health Effects: ______

First Aid Procedures When:

Inhaled: ______

In Contact with the Skin: ______

In Contact with the Eyes: ______

Ingested: ______

Emergency Medical Care: ______

HAZARDOUS REACTIVITY (see also Fire and Explosion) Ref.

Instability: ______

______ Stable
______ Self Reactive with Heat
______ Reacts Vigorously with (Specify) ______
______ Decomposes with Heat
______ Decomposition Temperature ______

Ref.

_____ Hazardous Decomposition Products Produced are (Specify)

____

_____ Other Conditions to Avoid are (Specify) _____________

____

Incompatibility: _____

_____ Incompatible with Water
_____ Incompatible with Water to Release Very Toxic Gas
_____ None Known
_____ Incompatible with (Specify Material(s)) _____________

____

Polymerization or Condensation: _____

_____ Polymerization will not Occur
_____ Vigorous Polymerization can Occur
_____ Conditions Leading to Polymerization are (Specify)

____

PREVENTIVE MEASURES

Ref.

Aquatic Toxicity: _____

_____ Aquatic Toxicity, 96 hr. LC 50 _______ ppm
_____ Highly Toxic to Aquatic Life, LC50 < 1 ppm
_____ Toxic to Aquatic Life, LC50 > 1 ppm < 50 ppm
_____ Other (Specify) _____________________

Spill, Leak, or Release: _____

_____ Flush to Wastewater Treatment System
_____ Flush to Chemical Sewer
_____ In Case of Spillage, Flush with Plenty of Water and Remove Contaminated Articles
_____ Dike Spill
_____ DO NOT Flush into Sewers
_____ DO NOT Sweep - Use Vacuum Cleaning Equipment Only
_____ Keep Upwind of Leak - Evacuate Until Gas has Dispersed
_____ Neutralizing Chemicals (Specify) _____________
_____ No Unusual Hazard
_____ Other (Specify) _____________________

Ref.

Waste Disposal: ______

______ Land Disposal
______ Flush to Storm Sewer
______ Drain to Sewer to Waste Treatment Plant
______ Sanitary Landfill
______ Incineration
______ Drain to (Specify) ______________________
______ Carbon Absorption
______ Disposal Contractors
______ DO NOT Burn
______ DO NOT Flush to Drain
______ Neutralize by (Specify) ______________________
______ In Accordance with Regulations

______ Other (Specify) ______________________

Personal Protective Equipment:

Eye/Face: ______

______ Face Shield
______ Coverall Chemical Safety Goggles
______ Other (Specify) ______________________
______ No Unusual Precautions

Hand and Arm: ______

______ Protective Gloves (Specify) ______________________
______ No Unusual Precautions

Respiratory: ______

______ Air Supplied Respirator
______ Air Purifying Respirator
______ Self-Contained Respirator
______ Other (Specify) ______________________
______ No Unusual Precautions

Other ______

______ Chemical Suit (Specify) ______________________

______ Protective Footwear (Specify) ______________________

______ Other (Specify) ______________________

______ No Unusual Precautions

STORAGE AND USE

Ref.

________ Keep in Well Ventilated Room
________ Store in Original Vented Container
________ Ventilate to Maintain Airborne Concentration Below

(Specify) ______________________________

________ Keep Away from Fire, Sparks, and Flame
________ Keep in Dry Container
________ DO NOT Heat Cylinders
________ Keep Container in Cool Place
________ Keep Container in Dark Place
________ Keep Container Tightly Closed
________ Keep Drum in Upright Position - DO NOT Roll Drum on Side

________ DO NOT Store with (Specify) ______________________

________ DO NOT Mix with (Specify) ______________________

________ Use only Dry, Clean Utensils in Handling
________ Wash Thoroughly after Handling

________ Other (Specify) ______________________

____

SPECIAL ENGINEERING CONTROLS

Ref.

SPECIAL SHIPPING INFORMATION

Ref.

REFERENCES

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________

____

ADDITIONAL INFORMATION

PREPARATION

Department/Division/Site: ______________________

Prepared by: ______________ (Please Print) ______________ (Signature) Date: __________

Telephone: ______________

Approved by: ______________ (Please Print) ______________ (Signature) Date __________

APPENDIX A.2

PRODUCT/INGREDIENT CLASSIFICATION SUMMARY SHEET

One-page summary sheet of information used for the classification of a product. Where the product is a mixture, use separate sheets for describing the characteristics of each ingredient and for those of the product as a whole.

PRODUCT OR INGREDIENT ____________ WT.% ______ PRODUCT ____________

CPR SECTION	CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
				INGRED.	PRODUCT
44-51	Acute Lethality - LD_{50} - LC_{50}				
52,58,59,63	Chronic Toxicity				
53,58	Teratogenicity, Embryotox.				
54,58	Carcinogenicity				
55,58	Reproductive Toxicity				
56,58	Resp. Tract Sensitization				
57,58,62,63	Mutagenicity				
60,63	Skin/Eye Irritation				
61,63	Skin Sensitization				
64	Biohazardous Infectious				
43-64	Poisonous and Infectious				
37,38	Liquid - Flash Point				
36	Gas - Flammable Range				
39	Solid - Flammability				
40	Aerosol - Flammability				
41	Reactive Flammable				
35-41	Flammable and Combustible				
65	Corrosive				
42	Oxidizing				
66	Dangerously Reactive				
34	Compressed Gas				
	References				

APPENDIX A.3

CASE EXAMPLE: CLASSIFICATION OF HYPOTHETICAL PRODUCT: XYZ CLEANER

CLASSIFICATION OF XYZ CLEANER

The hypothetical product, XYZ Cleaner, contains five ingredients:

Ingredient	Per cent by Weight
VM and P Naphtha	60 (Range 54-56)
2-Ethoxyethanol	31 (Range 28-34)
Sodium Dodecyl Benzene Sulphonate	0.8 (Range 0.7-0.9)
1,1,1-Trichloroethane (TCE)	8 (Range 7-9)
1,4-Dioxane (Stabilizer in TCE)	0.08 (Range 0.07-0.09)

The supplier carries out a literature search for physical and toxicological data on each of the ingredients. Some examples of original literature and database materials are shown at the end of this Appendix along with Product/Ingredient Classification Summary sheets for each ingredient.

In overview, the literature search provides classification information on the ingredients as follows:

1. VM and P Naphtha

   - Skin and eye irritant and concentration is not less than 1%; thus XYZ Cleaner is Toxic within WHMIS Class D, Division 2.*
   - Flashpoint 57°F.
   - Not corrosive.
   - Not an oxidizer.
   - Not dangerously reactive.

2. 2-Ethoxyethanol

   - An LC_{50} of 1,820 ppm is reported for a seven-hour exposure to 2-ethoxyethanol. This is converted to an equivalent four-hour exposure of 2,400 ppm using the formula reported in CPR, Section 44 and outlined on page 24 of this Chapter. Because the calculated LD_{50} is less than the criterion of 2,500 ppm and the concentration of 2-ethoxyethanol is not less than 1% in Product XYZ, the cleaner is Very Toxic and falls within WHMIS Class D, Division 1 on the basis of this property of the ingredient.*
   - Documented reproductive effects and concentration is not less than 0.1%; thus XYZ Cleaner is Very Toxic, WHMIS Class D, Division 2.*

---

* On the basis of properties of the ingredient, in the absence of test data on the mixture.

- Flashpoint 112°F.
- Not corrosive.
- Not an oxidizer.
- Not dangerously reactive.

3. Sodium Dodecyl Benzene Sulphonate

- Eye irritant, but concentration is less than 1%.
- Not corrosive.
- Not flammable or combustible.
- Not an oxidizer.
- Not dangerously reactive.

4. 1,1,1-Trichloroethane

- Eye, skin and respiratory tract irritant and concentration is not less than 1%, thus XYZ Cleaner is Toxic in WHMIS Class D, Division 2.*
- Not corrosive.
- Not flammable or combustible.
- Not an oxidizer.
- Not dangerously reactive.

5. 1,4-Dioxane

- An eye and respiratory tract irritant, but concentration is less than 1%.
- An IARC carcinogen, but concentration is less than 0.1%.
- Not corrosive.
- Not flammable or combustible.
- Not an oxidizer.
- Not dangerously reactive.

---

* On the basis of properties of the ingredient, in the absence of test data on the mixture.

On the basis of information on ingredients in XYZ Cleaner and in the absence of test data on the mixture, the supplier, using reasonable professional judgement, concludes that:

1. The product does not fall into WHMIS Classes A - Compressed Gas, C - Oxidizing Material, E - Corrosive Material, or F - Dangerously Reactive Material.

2. Because WHMIS permits classification within Class D on the basis of the properties of ingredients and cutoff concentrations, the supplier classifies the product as falling into Class D within:

   - Division 1, Subdivision A (Very Toxic) on the basis of LC_{50} data on 2-ethoxyethanol;

   - Division 2, Subdivision A (Very Toxic) on the basis of reproductive effects of 2-ethoxyethanol; and

   - Division 2, Subdivision B (Toxic) on the basis of irritant qualities of VM and P Naphtha, 2-ethoxyethanol and 1,1,1-trichloroethane.

   NOTE:

   - **Sodium dodecyl benzene sulphonate and 1,4-dioxane are irritant and carcinogenic (IARC) respectively, but have concentrations in XYZ Cleaner less than applicable cutoffs.**

   - **Of course, for mixtures, conclusions based on properties of ingredients are not as definitive as information based on evaluations and tests of the mixture itself.**

3. In the supplier's professional judgement, XYZ Cleaner is likely to be a Flammable Liquid (WHMIS Class C, Division 2) based on the flashpoints of the two major ingredients, VM and P Naphtha and 2-ethoxyethanol. This is confirmed when the supplier tests the mixture according to the applicable closed-cup flashpoint method in Schedule IV of CPR, and determines the flashpoint for the mixture to be 25°C (77°F).

Having classified XYZ Cleaner, the supplier then prepares a supplier label and material safety data sheet, based in part on the data used for classification.

NOTE: Information derived from the application of the very specific criteria for classification prescribed in CPR is likely to be incomplete when assembling overall hazard information on the product, particularly for material safety data sheets.

For example:

- **Although 1,1,1-trichloroethane is not flammable or combustible within WHMIS criteria, it can be ignited in the presence of an electric arc or other high energy source and hence may be dangerous if used as a metal cleaner in arc welding operations.**

- While none of VM and P Naphtha, 2-ethoxyethanol or 1,1,1-trichloroethane are dangerously reactive within the meaning of WHMIS Class F, two of the ingredients are incompatible with strong oxidizers and one with caustics and reactive metals. The classification concept of "dangerously reactive" overlaps with, but is not identical to, the hazard concept "incompatibility" which is reported on the MSDS.

INGREDIENT VM & P Naptha WT.% 60 PRODUCT XYZ Cleaner

CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
			INGRED.	PRODUCT
Acute Lethality - LD_{50}	No data	-	-	-
- LC_{50}	3400 ppm inhalation rat, 4 hr.			
Chronic Toxicity	No data	-	-	-
Teratogenicity, Embryotox.	No data	-	-	-
Carcinogenicity	No evidence - Not listed by IARC, ACGIH	-	-	-
Reproductive Toxicity	No data	-	-	-
Resp. Tract Sensitization	No data	-	-	-
Mutagenicity	No data	-	-	-
Skin/Eye Irritation	Positive evidence (RTECS) (DOC)	-	toxic	toxic
Skin Sensitization	No evidence	-	-	-
Biohazardous Infectious	Not applicable	-	-	-
Poisonous and Infectious		-	toxic	toxic
Liquid - Flash Point	57°F	flamm. liquid	flamm. liquid	determine
Gas - Flammable Range	Not applicable	-	-	-
Solid - Flammability	Not applicable	-	-	-
Aerosol - Flammability	Not applicable	-	-	-
Reactive Flammable	No evidence	-	-	-
Flammable and Combustible		flamm. liquid	flamm. liquid	determine
Corrosive	No evidence	-	-	-
Oxidizing	Not oxidizer	-	-	-
Dangerously Reactive	No evidence	-	-	-
Compressed Gas	Not applicable	-	-	-

References	(RTECS)	Registry of Toxic Effects of Chemical Substances
	(DOC)	Documentation of ACGIH TLV's

INGREDIENT 2- Ethoxyethanol WT.% 31 PRODUCT XYZ Cleaner

CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
			INGRED.	PRODUCT
Acute Lethality - LD_{50} - LC_{50}	2800-3460 mg/kg oral rat (PAT) 1820 ppm, 7 hr. mice (PAT) - 2400 ppm, 4 hr. (calculated)	-	toxic	toxic
Chronic Toxicity	Inhalation rat - 400 ppm, 90 day, reduced leukocyte. Oral rat - 93-741 mg/kg/day, hematological effects (1)	-	-	-
Teratogenicity, Embryotox.	Positive evidence	-	very toxic	very toxic
Carcinogenicity	Not listed by IARC, ACGIH, insufficient evidence	-	-	-
Reproductive Toxicity	Positive evidence	-	very toxic	very toxic
Resp. Tract Sensitization	No evidence	-	-	-
Mutagenicity	Insufficient evidence	-	-	-
Skin/Eye Irritation	Positive evidence	-	toxic	toxic
Skin Sensitization	No evidence	-	-	-
Biohazardous Infectious	Not applicable	-	-	-
Poisonous and Infectious		-	very toxic	very toxic (D1)
Liquid - Flash Point	112°F (closed cup)	-	-	-
Gas - Flammable Range	Not applicable	-	-	-
Solid - Flammability	Not applicable	-	-	-
Aerosol - Flammability	Not applicable	-	-	-
Reactive Flammable	No evidence	-	-	-
Flammable and Combustible		-	-	-
Corrosive	No evidence	-	-	-
Oxidizing	No evidence	-	-	-
Dangerously Reactive	No evidence	-	-	-
Compressed Gas	Not applicable	-	-	-

References (PAT) Patty's Industrial Hygiene and Toxicology
(1) Toxicity Review 10, Glycol Ethers, Health and Safety Executive

INGREDIENT Sodium Dodecyl Benzene Sulphonate WT.% 0.8 PRODUCT XYZ Cleaner

CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
			INGRED.	PRODUCT
Acute Lethality - LD_{50} - LC_{50}	1260 mg/kg oral rat (RTECS) No data	-	-	-
Chronic Toxicity	No evidence	-	-	-
Teratogenicity, Embryotox.	No data	-	-	-
Carcinogenicity	No evidence - not listed by IARC, ACGIH	-	-	-
Reproductive Toxicity	No data	-	-	-
Resp. Tract Sensitization	No data	-	-	-
Mutagenicity	No evidence	-	-	-
Skin/Eye Irritation	Severe eye irritant (1)	-	toxic	<1%
Skin Sensitization	No evidence	-	-	-
Biohazardous Infectious	Not applicable	-	-	-
Poisonous and Infectious		-	toxic	-
Liquid - Flash Point	Not flammable	-	-	-
Gas - Flammable Range	Not applicable	-	-	-
Solid - Flammability	Not applicable	-	-	-
Aerosol - Flammability	Not applicable	-	-	-
Reactive Flammable	No evidence	-	-	-
Flammable and Combustible		-	-	-
Corrosive	No evidence	-	-	-
Oxidizing	Not oxidizer	-	-	-
Dangerously Reactive	No evidence	-	-	-
Compressed Gas	Not applicable	-	-	-

References (1) On-line search - MEDLINE

INGREDIENT 1,1,1-Trichloroethane WT.% 8 PRODUCT XYZ Cleaner

CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
			INGRED.	PRODUCT
Acute Lethality - LD_{50} - LC_{50}	1100-14,300 mg/kg oral rat 18,000 ppm, inhalation rat, 4 hr. (1)	-	-	-
Chronic Toxicity	1000-2000 ppm - 0.6 hr. and 0.1 hr/day 90 days, guinea pig, no adverse effects (1)	-	-	-
Teratogenicity, Embryotox.	Insufficient evidence	-	-	-
Carcinogenicity	No evidence - not listed by IARC, ACGIH	-	-	-
Reproductive Toxicity	No evidence	-	-	-
Resp. Tract Sensitization	No evidence	-	-	-
Mutagenicity	Insufficient evidence	-	-	-
Skin/Eye Irritation	Positive evidence (RTECS)	-	toxic	toxic
Skin Sensitization	No evidence	-	-	-
Biohazardous Infectious	Not applicable	-	-	-
Poisonous and Infectious		-	toxic	toxic (D2)
Liquid - Flash Point	Not flammable	-	-	-
Gas - Flammable Range	Not applicable	-	-	-
Solid - Flammability	Not applicable	-	-	-
Aerosol - Flammability	Not applicable	-	-	-
Reactive Flammable	No evidence	-	-	-
Flammable and Combustible		-	-	-
Corrosive	No evidence	-	-	-
Oxidizing	Not oxidizer	-	-	-
Dangerously Reactive	No evidence	-	-	-
Compressed Gas	Not applicable	-	-	-

References (1) NTIS Health Assessment Document for 1,1,1 Trichloroethane
(RTECS) Registry of Toxic Effects of Chemical Substances

INGREDIENT 1,4-Dioxane WT.% 0.08 PRODUCT XYZ Cleaner

CLASSIFICATION CRITERIA	DATA, TEST METHODS, REFERENCES	TDG CLASS	WHMIS CLASS	
			INGRED.	PRODUCT
Acute Lethality - LD_{50} - LC_{50}	4200 mg/kg oral rat (RTECS) Inhalation rat - 46,000 mg/m^3 - 2 hr. - 32,500 mg/m^3 - 4 hr. (RTECS)	-	-	-
Chronic Toxicity	Limited data. Chronic exposure to"low" concs. above TLV has produced fatals. with kidney, liver damage.	-	-	-
Teratogenicity, Embryotox.	Insufficient evidence	-	-	-
Carcinogenicity	IARC group 2B, also listed by NTP	-	very toxic	< 0.1%
Reproductive Toxicity	No data	-	-	-
Resp. Tract Sensitization	Insufficient evidence	-	-	-
Mutagenicity	No evidence	-	-	-
Skin/Eye Irritation	Positive evidence - eye irritant	-	toxic	-
Skin Sensitization	No data	-	-	-
Biohazardous Infectious	Not applicable	-	-	-
Poisonous and Infectious		-	very toxic	-
Liquid - Flash Point	54°F	flamm. liquid	flamm. liquid	-
Gas - Flammable Range	Not applicable			-
Solid - Flammability	Not applicable	-	-	-
Aerosol - Flammability	Not applicable	-	-	-
Reactive Flammable	No evidence	-	-	-
Flammable and Combustible		flamm. liquid	flammable liquid B2	-
Corrosive	Insufficient evidence	-	-	-
Oxidizing	Not oxidizer	-	-	-
Dangerously Reactive	No evidence	-	-	-
Compressed Gas	Not applicable	-	-	-

References (RTECS) Registry of Toxic Effects of Chemical Substances

HAZARD INFORMATION SOURCES

1. Canada - Transportation of Dangerous Goods Act and Regulations - Schedule II, List II.

2. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man - World Health Organization, International Agency for Research on Cancer - multivolume work. Available from: WHO Publications Centre, 49 Sheridan Ave., Albany, N.Y., 12210, U.S.A.

3. i) Threshold Limit Values and Biological Exposure Indices for 1987-88 (revised each year). Booklet.

   ii) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices - 5th Edition 1986 - American Conference of Governmental Industrial Hygienists Inc. (ACGIH), 6500 Glenway Ave., Bldg. D-7, Cincinnati, Ohio, 45211, U.S.A.

4. NIOSH Registry of Toxic Effects of Chemical Substances (RTECS) - National Institute for Occupational Health and Safety, Cincinnati, Ohio, 45226, U.S.A. Sold by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402, U.S.A. 1981-82 Edition plus 1983-84 Supplements. Also available on CCOHS Computer Data Base.

5. Patty's Industrial Hygiene and Toxicology, 3rd Edition, 6 volumes. Published by John Wiley & Sons.

6. NIOSH Pocket Guide to Chemical Hazards - September 1985. NIOSH Publication 78-210. Sold by Superintendent of Documents, U.S. Government Printing Service.

7. Clinical Toxicology of Commercial Products - Gleason, Gosselin and Hodge. Published by Williams & Wilkins, Baltimore, MD.

8. Toxicology of the Eye - W. Morton Grant. Published by Charles C. Thomas, Springfield, IL.

9. The Merck Index - An Encyclopedia of Chemicals and Drugs. Published by Mack & Co. Inc., Rahway, N.J., 07065.

10. i) Matheson Gas Data Book.

    ii) Guide to Safe Handling of Compressed Gases - Matheson, Division of Searle Products.

11. Handbook of Reactive Chemical Hazards - L. Bretherick. Published by Butterworth Publications.

12. Fire Protection Guide on Hazardous Materials - National Fire Protection Association (NFPA), Boston, MA.

13. Handbook of Toxic and Hazardous Chemicals and Carcinogens, by Marshall Sittig. Published by Noyes Publications, Park Ridge, N.J.

Extract from: The Documentation of the Threshold Limit Values and Biological Exposure Indices, ACGIH

METHYL CHLOROFORM

CAS: 71-55-6

1,1,1-Trichloroethane

CH_3CCl_3

TLV-TWA, 350 ppm (≈ 1900 mg/m^3)
TLV-STEL, 450 ppm (≈ 2450 mg/m^3)

Methyl chloroform is a water-clear, nonflammable liquid. Its physiochemical properties include:

Molecular weight: 133.42
Specific gravity: 1.3376 at 20°C
Solidifies: -32.5°C
Boiling point: 74.1°C
Vapor pressure: 100 torr at 20°C

It burns only in excess oxygen or in air if a strong source of ignition is present. It is almost insoluble in water, but is miscible with most organic solvents.

The major usage of methyl chloroform is as a cleaning solvent. Because of its reactivity with magnesium, aluminum and their alloys, inhibitors are generally added to increase the stability of the solvent.

The oral toxicity of methyl chloroform is low. The LD_{50} for rats, mice, rabbits and guinea pigs was reported to range from 5.7 to 12.3 g/kg.(1) Like many solvents, methyl chloroform will defat the skin, causing redness and scaliness. Absorption through the skin can occur but is not a significant route of toxic exposure; the acute LD_{50} for rabbits is greater than 16 g/kg. When doses of 0.5 g/kg were applied repeatedly for 90 days to rabbits, no effects were caused except for slight reversible irritation of the skin at the site of application.(1)

While comparatively low in systemic toxicity, methyl chloroform is an anesthetic and is capable of causing death when inhaled at concentrations in excess of 14,000-15,000 ppm.(1)

Torkelson and associates(1) described the toxicity of methyl chloroform from repeated exposures of animals. Exposure of animals for three months at concentrations from 1000 to 10,000 ppm caused some pathologic changes in the livers and lungs of some species; the main effect of exposure appeared to be anesthesia. Exposure to the vapor at 500 ppm for seven hours a day, five days a week for six months did not cause any toxic changes of significance in rats, guinea pigs, rabbits or monkeys.

Rowe and associates(2) found that the only effect of repeated exposure of several species at 500 ppm of a mixture containing 75% methyl chloroform and 25% perchloroethylene was a slight degression in the growth of guinea pigs, due to a reduced food intake. At 1000 ppm mild, reversible liver and kidney changes were detected. A time-weighted average limit of 400 ppm was recommended for this mixture.

Other animal studies confirm the low hepatotoxicity of methyl chloroform,(3,4) but indicates that cardiac sensitization can occur if exposures are excessive.(5,6) Studies in dogs given intravenous injections of epinephrine in conjunction with exposure to either 2500, 5000 or 10,000 ppm vapor have been described. Under these exaggerated conditions, no cardiac sensitization was observed at 2500 ppm, but 3 of 18 dogs at 5000 ppm and 12 of 12 at 10,000 ppm were affected.(6) Other studies in rabbits, rats and mice, as well as human experience in anesthesiology, confirm the cardiac effects of methyl chloroform.(7,8) Methyl chloroform is poorly metabolized and is excreted unchanged in the expired air of animals and human test subjects.(9)

Methyl chloroform did not produce teratogenic effects in rats or mice exposed 7 hours per day to 875 ppm during the period of organogenisis.(10) Two lifetime cancer studies have been negative. There were no adverse effects of any kind in rats exposed 6 hours per day for 12 months to either 875 or 1750 ppm vapors.(11) Groups of rats and mice fed methyl chloroform by gavage in the National Cancer Institute (NCI) Bioassay Program showed no increase in tumors over that of the controls.(12) The dosage levels fed were 1500 and 750 g/kg/day.

Industrial experience has been consistent with the findings in laboratory animals.(13) Deaths due to anesthesia and/or cardiac sensitization have been reported to have occurred in poorly ventilated rooms, pits, tanks and other small areas.(11,13) Removal of unconscious individuals has generally resulted in rapid and complete recovery.

In a few test subjects beginning anesthetic effects occur at concentrations approaching 500 ppm.(14) The most extensive study of neurological response has been by Stewart and associates who reported that

> "... *repetitive vapor exposure to ... 350 ppm produced no untoward subjective or objective health response* ..."(15)

Some female test subjects did object slightly to the odor at this concentration. In practice, odor is not a problem until exposure concentrations approach 500 ppm.(13)

The most extensive study of industrially exposed workers has been reported by Kramer and associates who conducted an epidemiological study on 151 men and women exposed for several months to six years to methyl chloroform.(16) During the study period exposures for some workers exceeded 200 ppm. Based on subjective responses and some previous monitoring data, exposure concentrations had been higher prior to study period. When compared to 151 matched pair control subjects by numerous medical and physiological parameters, there were no adverse effects related to exposure.

A time-weighted average TLV for methyl chloroform of 350 ppm is recommended to prevent beginning anesthetic effects and objections to odor. A STEL of 450 ppm is recommended for protection against anesthesia.

Other recommendations: West Germany (1974) 200 ppm; East Germany (1973) 90 ppm; Sweden (197 8) 70 ppm; USSR (1972) 4 ppm; Czechoslovakia (1969) 90 ppm.

References

1. Torkelson, T.R. et al: *Am. Ind. Hyg. Assoc. J. 19*:353 (1958).
2. Rowe, V.K. et al: *Ibid. 24*:541 (1963).
3. Gehring, P.J.: *Tox. Appl. Pharm. 13*:287 (1968).
4. Plaa, G.L., E.A. Evans and C.H. Hine: *J. Pharm. Expel. Therap. 123*:224 (1958).
5. Rennick, B.R. et al: *Fed. Proc. 8*:327 (1949).
6. Trochimowicz, H.J. et al: *JOM 18*:26 (1976).
7. Aviado, D.M. et al: *Methyl Chloroform and Trichloroethylene in the Environment.* Clinical Rubber Press, Cleveland, OH (1976).
8. Dornette, W.H. and J.P. Jones: *Anesth. Analg. 39*:249 (1966).
9. Hake, C.L. et al: *Arch. Env. Health 1*:101 (1966).
10. Schwetz, B.A. et al: *TAP 32*:84 (1975).
11. NIOSH: *Criteria for a Recommended Standard — Occupational Exposure to 1,1,1-Trichloroethane.* DHEW Pub. No. (NIOSH) 76-184 (1976).
12. Weisburger, E.: *Env. Health Perspectives 21*:7 (1977).
13. Patty, F.A.: *Industrial Hygiene and Toxicology*, 2nd ed., Vol. II, p. 1288. Interscience, New York (1963).

REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES 1981-82

Extract from: NIOSH RTECS for 2-Ethoxy ethanol.

KK8050000 ETHANOL, 2-ETHOXY-

[illegible] CAS: 110-80-5 MW: 90.14 MOLFM: C4-H10-O2

SYN: AETHYLENGLYKOL-MONOAETHYLAETHER (German) * CELLOSOLVE * CELLOSOLVE (DOT) * CELLOSOLVE SOLVENT * DOWANOL EE * ETHER MONOETHYLIQUE DE L'ETHYLENE-GLYCOL (French) * 2-ETHOXYETHANOL * ETHYL CELLOSOLVE * ETHYLENE GLYCOL ETHYL ETHER * ETHYLENE GLYCOL MONOETHYL ETHER * ETHYLENE GLYCOL MONOETHYL ETHER (DOT) * 2-ETOKSYETYLOWY ALKOHOL (Polish) * GLYCOL ETHYL ETHER * GLYCOL MONOETHYL ETHER * HYDROXY ETHER * NCI-C54853 * OXITOL * POLY-SOLV EE

IRRITATION DATA AND REFERENCES:

	eye-hmn 6000 ppm	PHRPA6 45,1459,30
	skn-rbt 500 mg open MLD	UCDS** 5/28/66
	eye-rbt 20 mg MOD	UCDS** 5/28/66
	eye-gpg 10 mg MLD	JPPMAB 11,150,59

REPRODUCTIVE EFFECTS DATA AND REFERENCES:

3T25T27	orl-rat TDLo:7020 mg/kg (1-21D preg)	ARZNAD 21,880,71
1T46	orl-rat TDLo:1935 mg/kg (1-21D preg)	ARZNAD 21,880,71
1T26	ihl-rat TCLo:767 ppm/7H (1-19D preg)	TOXID9 1,38,81
3T26T46T47	ihl-rat TCLo:200 ppm/7H (1-19D preg)	SWEHDO 7(Suppl 4),66,81
3T25T26	ihl-rat TCLo:765 ppm/7H (1-19D preg)	SWEHDO 7(Suppl 4),66,81
3T16T86	ihl-rat TCLo:100 ppm/7H (14-20D preg)	TJADAB 21,58A,80
1T46	ivn-rat TDLo:1935 mg/kg (1-21D preg)	ARZNAD 21,880,71
1T82	orl-mus TDLo:23 gm/kg (23D male)	SAIGBL 21,29,79
1T26	ihl-rbt TCLo:617 ppm/7H (1-18D preg)	TOXID9 1,38,81
3T45T46T47	ihl-rbt TCLo:160 ppm/7H (1-18D preg)	SWEHDO 7(Suppl 4),66,81
3T25T26T35	ihl-rbt TCLo:160 ppm/7H (1-18D preg)	SWEHDO 7(Suppl 4),66,81

TOXICITY DATA AND REFERENCES:

	orl-rat LD50:3000 mg/kg	JIHTAB 23,259,41
	ihl-rat LCLo:4000 ppm/4H	JIHTAB 31,343,49
	orl-mus LD50:4300 mg/kg	JIHTAB 21,173,39
	ipr-rat LDLo:1200 mg/kg	JPPMAB 11,150,59
	ivn-rat LD50:2400 mg/kg	NPIRI* 1,56,74
3T79J22M14	ihl-mus LC50:1820 ppm/7H	JIHTAB 25,157,43
	ipr-mus LD50:1710 mg/kg	JPETAB 98,208,47
	scu-mus LDLo:5 gm/kg	JPETAB 42,355,31
	ivn-mus LD50:3900 mg/kg	ARZNAD 21,880,71
3F01F23	orl-rbt LD50:3100 mg/kg	AMIHAB 14,114,56
	skn-rbt LD50:3300 mg/kg	UCDS** 5/28/66
	orl-gpg LD50:1400 mg/kg	JIHTAB 23,259,41
	ihl-gpg LCLo:3000 ppm/24H	PHRPA6 45,1459,30

AQUATIC TOXICITY RATING: TLm96:1000-100 ppm WQCHM* 2,-,74

REVIEW: TLV-TWA 5 ppm (skin) DTLWS* 4,171,80

STANDARDS & REGULATIONS:

OSHA STANDARD-air:TWA 200 ppm (skin) (SCP-V) FEREAC 39,23540,74

DOT-COMBUSTIBLE LIQUID, LABEL:NONE FEREAC 41,57018,76

STATUS: CURRENTLY TESTED BY NTP FOR CARCINOGENESIS BIOASSAY AS OF JANUARY 1982

STATUS: NIOSH MANUAL OF ANALYTICAL METHODS VOL 3 S361

STATUS: REPORTED IN EPA TSCA INVENTORY, 1980

REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES, 1983-84 SUPPLEMENT

KK8050000 ETHANOL, 2-ETHOXY-

[illegible] CAS: 110-80-5 MW: 90.14 MOLFM: C4-H10-O2

SYN: AETHYLENGLYKOL-MONOAETHYLAETHER (German) * CELLOSOLVE * CELLOSOLVE (DOT) * CELLOSOLVE SOLVENT * DOWANOL EE * EKTASOLVE EE * ETHER MONOETHYLIQUE DE L'ETHYLENE-GLYCOL (French) * 2-ETHOXYETHANOL * ETHYL CELLOSOLVE * ETHYLENE GLYCOL ETHYL ETHER * ETHYLENE GLYCOL MONOETHYL ETHER * ETHYLENE GLYCOL MONOETHYL ETHER (DOT) * 2-ETOKSYETYLOWY ALKOHOL (Polish) * GLYCOL ETHER EE * GLYCOL ETHYL ETHER * GLYCOL MONOETHYL ETHER * HYDROXY ETHER * JEFFERSOL EE * NCI-C54853 * OXITOL * POLY-SOLV EE * UN 1171 (DOT)

IRRITATION DATA AND REFERENCES:

	eye-hmn 6000 ppm	PHRPA6 45,1459,30
	skn-rbt 500 mg open MLD	UCDS** 5/28/66
	eye-rbt 20 mg MOD	UCDS** 5/28/66
	eye-gpg 10 mg MLD	JPPMAB 11,150,59

REPRODUCTIVE EFFECTS DATA AND REFERENCES:

3T25T27	orl-rat TDLo:7020 mg/kg (1-21D preg)	ARZNAD 21,880,71
3T26T46T47	orl-rat TDLo:600 mg/kg (10-12D preg)	TOXID9 4,57,84
1T26	orl-rat TDLo:1000 mg/kg (7-15D preg)	TOXID9 4,57,84
1T81	orl-rat TDLo:28000 mg/kg (28D male)	TOXID9 4,51,84
1T26	ihl-rat TCLo:767 ppm/7H (1-19D preg)	TOXID9 1,38,81
3T26T46T47	ihl-rat TCLo:200 ppm/7H (1-19D preg)	SWEHDO 7(Suppl 4),66,81
3T25T35	ihl-rat TCLo:600 ppm/7H (7-13D preg)	NETSDH 2,231,81
3T16T86	ihl-rat TCLo:100 ppm/7H (14-20D preg)	TJADAB 21,58A,80
3T25T26T34	skn-rat TDLo:50 gm/kg (7-16D preg)	DCTODJ 5,277,82
3T46T47	skn-rat TDLo:50 gm/kg (7-16D preg)	DCTODJ 5,277,82
1T46	ivn-rat TDLo:1935 mg/kg (1-21D preg)	ARZNAD 21,880,71
1T82	orl-mus TDLo:23 gm/kg (23D male)	SAIGBL 21,29,79
1T26	ihl-rbt TCLo:617 ppm/7H (1-18D preg)	TOXID9 1,38,81
3T45T46T47	ihl-rbt TCLo:160 ppm/7H (1-18D preg)	SWEHDO 7(Suppl 4),66,81
3T25T26T35	ihl-rbt TCLo:160 ppm/7H (1-18D preg)	SWEHDO 7(Suppl 4),66,81
1T30	ihl-rbt TCLo:160 ppm/7H (1-18D preg)	SWEHDO 7(Suppl 4),66,81
3T13T39	ihl-rbt TCLo:617 ppm/7H (1-18D preg)	NTIS** PB83-258574

TOXICITY DATA AND REFERENCES:

	orl-rat LD50:3000 mg/kg	JIHTAB 23,259,41
	ihl-rat LCLo:4000 ppm/4H	JIHTAB 31,343,49
•	skn-rat LD50:3900 mg/kg	TOXID9 4,108,84
	ipr-rat LDLo:1200 mg/kg	JPPMAB 11,150,59
	ivn-rat LD50:2400 mg/kg	NPIRI* 1,56,74
•	unk-rat LD50:7750 mg/kg	GISAAA 47(5),84,82
	orl-mus LD50:4300 mg/kg	JIHTAB 21,173,39
3T79J22M14	ihl-mus LC50:1820 ppm/7H	JIHTAB 25,157,43
3J16M02P27	ipr-mus LD50:1707 mg/kg	FEPRAJ 6,342,47
	scu-mus LDLo:5 gm/kg	JPETAB 42,355,31
	ivn-mus LD50:3900 mg/kg	ARZNAD 21,880,71
•	unk-mus LD50:5799 mg/kg	GISAAA 47(5),84,82
3F01F23	orl-rbt LD50:3100 mg/kg	AMIHAB 14,114,56
	skn-rbt LD50:3300 mg/kg	UCDS** 5/28/66
	orl-gpg LD50:1400 mg/kg	JIHTAB 23,259,41
	ihl-gpg LCLo:3000 ppm/24H	PHRPA6 45,1459,30
•	unk-gpg LD50:3070 mg/kg	GISAAA 47(5),84,82

REVIEW AND REFERENCES:

★ TLV-TWA 5 ppm (skin) DTLWS* 4,171,80

STANDARDS & REGULATIONS:

★ OSHA STANDARD-air:TWA 200 ppm (skin) (SCP-V) FEREAC 39,23540,74

★ DOT-HAZARD:COMBUSTIBLE LIQUID; LABEL:NONE CFRGBR 49,172.101,82

★ DOT-IMO:FLAMMABLE or COMBUSTIBLE LIQUID; LABEL:FLAMMABLE LIQUID CFRGBR 49,172.102,82

STATUS:

NTP CARCINOGENESIS STUDIES; ON TEST, OCTOBER 1984

NIOSH MANUAL OF ANALYTICAL METHODS, 3rd Ed., see METHOD 1403

★ NIOSH CURRENT INTELLIGENCE BULLETIN, #39

REPORTED IN EPA TSCA INVENTORY, 1983

EPA TSCA SECTION 8(e) STATUS REPORT 8EHQ-0381-0386

MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE

TOXICITY DATA HAVE NOT BEEN EVALUATED.
OMISSION OF A SUBSTANCE OR NOTATION DOES NOT IMPLY ANY RELIEF FROM REGULATORY RESPONSIBILITY.

Extract from: Toxnet Database from Library of Medicine

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WELCOME TO THE NATIONAL LIBRARY OF MEDICINE'S
    TOXICOLOGY DATA NETWORK (TOXNET)

YOU ARE NOW CONNECTED TO THE HAZARDOUS SUBSTANCES DATABANK FILE.
SOME DATA IN THIS FILE MAY NOT BE PEER REVIEWED.


SS 1 /C?
USER:
25155-30-0 (rn)

    SEARCH IN PROGRESS...
SS (1) PSTG (1)

SS 2 /C?
USER:
prt cpp, wrnp, prvn, toxb, opl indented continuous



HAZARDOUS SUBSTANCES          740
 DATABANK NUMBER
NAME OF SUBSTANCE             SODIUM DODECYLBENZENESULFONATE
CAS REGISTRY NUMBER           25155-30-0
COLOR/FORM                    WHITE TO LIGHT YELLOW FLAKES, GRANULES, OR
                              POWDER [Hawley, G.G. The Condensed Chemical
                              Dictionary. 10th ed. New York: Van Nostrand
                              Reinhold Co., 1981. , p. 939] **ACCEPTED**
MOLECULAR WEIGHT              348.52 [U.S. Department of Health and Human
                              Services, Public Health Service, Center for
                              Disease Control, National Institute for
                              Occupational Safety Health. Registry of
                              Toxic Effects of Chemical Substances
                              (RTECS). National Library of Medicine's
                              current MEDLINE file. 84/8308] **ACCEPTED**
SKIN, EYE AND RESPIRATORY     May cause skin irritation.
 IRRITATIONS                  [The Merck Index. 10th ed. Rahway, New
                              Jersey: Merck Co., Inc., 1983. , p. 1234]
                              **UNREVIEWED**
TOXIC HAZARD RATING           SEE ALKYL ARYL SODIUM SULFONATES. 3. 3=
                              MODERATELY TOXIC: PROBABLE ORAL LETHAL DOSE
                              (HUMAN) 0.5-5 G/KG; BETWEEN 1 OZ AND 1 PINT
                              (OR 1 LB) FOR 70 KG PERSON (150 LB). /ALKYL
                              ARYL SODIUM SULFONATES/ [Gosselin, R.E.,
                              H.C. Hodge, R.P. Smith, and M.N. Gleason.
                              Clinical Toxicology of Commercial Products.
                              4th ed. Baltimore: Williams and Wilkins,
                              1976. II-047] **ACCEPTED**
POISONING POTENTIAL           ND
ANTIDOTE AND EMERGENCY        SEE DETERGENTS & SOAPS- ANIONIC & NONIONIC.
 TREATMENT                    GENERAL MGMNT: A) ESTABLISH RESPIRATION;
                              CREATE ARTIFICIAL AIRWAY IF NECESSARY. CHECK
                              ADEQUACY OF TIDAL VOL (NORMAL= 10-15 CC/KG).
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	PREVENTION OF ABSORPTION: ORAL: A) IF /NO/ SPONTANEOUS EMESIS...WITHIN ONE HR...NO FURTHER TREATMENT IS REQUIRED. IF...SUSPICION THAT ADDNL AGENTS...INGESTED, EMESIS SHOULD BE INDUCED. EMESIS...INITIATED UNLESS PT IS COMATOSE, CONVULSING, OR HAS LOST GAG REFLEX. IF...CONTRAINDICATIONS...PRESENT, ENDOTRACHEAL INTUBATION SHOULD PRECEDE GASTRIC LAVAGE WITH LARGE-BORE TUBE. B) ADMIN OF ACTIVATED CHARCOAL...UNNECESSARY. C) ADMIN OF CATHARTIC...UNNECESSARY. /DETERGENTS & SOAPS ANIONIC & NONIONIC/ [Rumack, B.H. (ed.) Poisindex. Microfiche Edition. Denver, Colorado: Micromedex, Inc., in association with the National Center for Poison Information, with updates, 1975-present. MGT 1/EXP 8408] **ACCEPTED**
ANTIDOTE AND EMERGENCY TREATMENT	SEE DETERGENTS & SOAPS- ANIONIC & NONIONIC. ORAL EXPOSURE: IF SPONTANEOUS EMESIS HAS NOT OCCURRED WITHIN 1 HR OF INGESTION...UNLIKELY THAT A TOXIC DOSE HAS BEEN INGESTED & NO FURTHER TREATMENT REQUIRED. B) HYPOCALCEMIA: WHEN DOCUMENTED...TREATED WITH IV CALCIUM GLUCONATE @ DOSAGE OF 100 MG/30 SEC TO MAX OF 1 G. PT SHOULD BE OBSERVED FOR BRADYCARDIA WITH CARDIAC MONITOR (RARE). C) PT SHOULD BE EVALUATED FOR BURNS TO MOUTH & ESOPHAGUS. /DETERGENTS & SOAPS- ANIONIC & NONIONIC/ [Rumack, B.H. (ed.) Poisindex. Microfiche Edition. Denver, Colorado: Micromedex, Inc., in association with the National Center for Poison Information, with updates, 1975-present. MGT/1 EXP 8408] **UNREVIEWED**
ANTIDOTE AND EMERGENCY TREATMENT	SEE DETERGENTS & SOAPS- ANIONIC & NONIONIC. EYE EXPOSURE: A) EXPOSED EYES SHOULD BE IRRIGATED COPIOUSLY WITH WATER FOR @ LEAST 15 MIN. B) OPHTHALMIC EXAM SHOULD BE PERFORMED IF IRRITATION OR PAIN PERSISTS AFTER...IRRIGATION... DERMAL EXPOSURE: A) PT...SHOULD WASH EXPOSED AREA TWICE WITH SOAP & WATER. B) PHYSICIAN SHOULD EXAMINE EXPOSED AREA IF IRRITATION OR PAIN PERSISTS... /DETERGENTS & SOAPS- ANIONIC & NONIONIC/ [Rumack, B.H. (ed.) Poisindex. Microfiche Edition. Denver, Colorado: Micromedex, Inc., in association with the National Center for Poison Information, with updates, 1975-present. MGT 1/EXP 8408] **UNREVIEWED**
MEDICAL SURVEILLANCE	ND
HUMAN TOXICITY EXCERPTS	MAY CAUSE SKIN IRRITATION. IF SWALLOWED WILL CAUSE VOMITING. [The Merck Index. 10th ed.

	Rahway, New Jersey: Merck Co., Inc., 1983. , p. 1234] **ACCEPTED**
HUMAN TOXICITY EXCERPTS	SEE ALKYL ARYL SODIUM SULFONATES. PROLONGED SKIN CONTACT WITH SOLN MAY CAUSE IRRITATION, BUT SENSITIZATION OR ALLERGIC REACTIONS ARE RARE. /ALKYL ARYL SODIUM SULFONATES/ [Gosselin, R.E., H.C. Hodge, R.P. Smith, and M.N. Gleason. Clinical Toxicology of Commercial Products. 4th ed. Baltimore: Williams and Wilkins, 1976. II-047] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	SEE ALKYL ARYL SODIUM SULFONATE. MECHANISM OF DEATH AFTER HIGH ORAL DOSES IN ANIMALS IS NOT KNOWN. AT LOW LEVELS FEEDING EXPERIMENTS HAVE PRODUCED NO EVIDENCE OF SYSTEMIC TOXICITY IN RATS. /ALKYL ARYL SODIUM SULFONATES/ [Gosselin, R.E., H.C. Hodge, R.P. Smith, and M.N. Gleason. Clinical Toxicology of Commercial Products. 4th ed. Baltimore: Williams and Wilkins, 1976. II-047] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	SODIUM LAURYL BENZENESULFONATE, ORALLY ADMIN TO MICE @ 1/2 LD50 DID NOT PRODUCE CHROMOSOMAL ABNORMALITIES IN BONE MARROW. [INOUE K ET AL; IN VIVO CYTOGENETIC TESTS OF SOME SYNTHETIC DETERGENTS IN MICE; OSAKA-FURITSU KOSHU EISEI KENKYUSHO KENKYU HOKOKU, SHOKUHIN EISEI HEN 8: 17-24 (1977)] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	SODIUM ALKYLBENZENESULFONATE ADDED TO HAMSTER LUNG CELL CULTURE @ 62.5 MUG/ML INDUCED CELL MUTATION, NO EFFECT ON SISTER CHROMATID EXCHANGE. SODIUM ALKYLBENZENESULFONATE ADDED TO HAMSTER LUNG CELL CULTURE MEDIUM @ 125 MUG/L DESTROYED THE CELLS COMPLETELY. [INOUE K ET AL; EFFECT OF SODIUM ALKYLBENZENESULFONATE (ABS) ON FREQUENCIES OF SISTER CHROMATID EXCHANGES; OSAKA-FURITSU KOSHU EISEI KENKYUSHO KENKYU HOKOKU, SHOKUHIN EISEI HEN 8: 25-8 (1977)] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	SODIUM DODECYLBENZENE SULFONATE FED TO RATS FOR 90 DAYS. NO ADVERSE EFFECTS IN GROWTH, FOOD CONSUMPTION & UTILIZATION, SURVIVAL, BLOOD OR URINE VALUES, ORGAN WT, BODY WT OR NO GROSS OR MICROSCOPIC TISSUE CHANGE. [KAY JH ET AL; SUBACUTE ORAL TOXICITY OF BIODEGRADABLE, LINEAR ALKYLBENZENE SULFONATE; TOXICOL APPL PHARMACOL 7 (6): 812-8 (1965)] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	THE SURFACTANT, SODIUM LAURYLBENZENESULFONATE, INHIBITED FERTILIZATION, & RETARDED EMBRYONIC DEVELOPMENT & BONE FORMATION. 50% INHIBITION

	WAS OBSERVED WHEN EGGS WERE EXPOSED TO 4-5 UMOL. MORPHOLOGICAL CHANGES WERE OBSERVED. [ISONO N; EFFECT OF SURFACTANTS ON MARINE INVERTEBRATES' EGGS; SEITAI KAGAKU 2 (1): 23-32 (1970)] **ACCEPTED**
NON-HUMAN TOXICITY EXCERPTS	Adverse effect of dietary Tween 20, Tween 60 & sodium laurylbenzenesulfonate (LBS) & the effect of the concurrent feeding of dietary fiber were investigated in rats. A significant redn in intestinal sucrase activity, which localized in the brush border membrane of the small intestine was observed in rats fed on a high sucrose diet containing one of these detergents together with growth retardation & diarrhea. LBS had a high exfoliating or releasing effect on the brush border membrane, whereas Tween 20 & Tween 60 had low effects, which could be prevented with concurrent feeding of dietary fiber. [Kimura T, Yoshida A; Toxicity of detergent feeding and effect of the concurrent feeding of dietary fiber in rats; Nutr Rep Int 26 (2): 271-9 (1982)] **UNREVIEWED**
NON-HUMAN TOXICITY EXCERPTS	The proliferation rate of the connective tissue was examined by measuring the activity of proline hydroxylase. The dorsal neck skin of rats was coated with sodium laurylbenzenesulfonate for four successive days, and on the 5th day, the enzyme activity in the skin was measured. The proline hydroxylase in the part of the skin coated with the irritants showed clearly higher activity than normal skin, although it was still lower than the injured skin region prepared as a positive control. Two methods were investigated to extract the enzyme: one was to homogenize the whole skin, and the other to shave off the skin with a knife. The latter proved to very efficient for enzyme extraction. [Fujise H, Aoyama M; Objective evaluation of dermal irritant by determination of proline hydroxylase activity in rat skin; Nagoya Med J 28 (3-4): 211-15 (1984)] **UNREVIEWED**
HUMAN TOXICITY VALUES	ND
NON-HUMAN TOXICITY VALUES	LD50 MICE ORAL 2000 MG/KG [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **ACCEPTED**

NON-HUMAN TOXICITY VALUES	LD50 MICE INTRAVENOUS 105 MG/KG [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **ACCEPTED**
NON-HUMAN TOXICITY VALUES	LD50 RATS ORAL 1260 MG/KG [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **ACCEPTED**
NON-HUMAN TOXICITY VALUES	Irritant dose rabbits dermal 500 mg/24 hr; irritant effects: moderate skin irritation [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **ACCEPTED**
NON-HUMAN TOXICITY VALUES	Irritant dose rabbits ocular 250 ug/24 hr; irritant effects: severe eye irritation [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **ACCEPTED**
NON-HUMAN TOXICITY VALUES	Irritant dose rabbits ocular 1%; irritant effects: severe eye irritation [U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety Health. Registry of Toxic Effects of Chemical Substances (RTECS). National Library of Medicine's current MEDLINE file. 84/8308] **UNREVIEWED**
ECOTOXICITY VALUES	EC50 Daphnia magna IRCHA less than 10 mg/L [Bringman G, Kuehn R; Results of toxic action of water pollutants on Daphnia magna Straus tested by an improved standardized procedure; Z Wasser Abwasser Forsch 15 (1): 1-6 (1982)] **UNREVIEWED**
NATIONAL TOXICOLOGY PROGRAM REPORTS	ND
IARC SUMMARY AND EVALUATION	ND
TSCA TEST SUBMISSIONS	ND

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MINIMUM FATAL DOSE LEVEL     ND
POPULATIONS AT SPECIAL       ND
 RISK
ABSORPTION, DISTRIBUTION     LABELED SODIUM ALKYLBENZENESULFONATE AT
 AND EXCRETION               CONCN CLOSE TO THOSE FOUND IN POLLUTED WATER
                             WERE READILY ABSORBED BY CARPS. ROUTE OF
                             ABSORPTION WAS GILL OR SKIN. THE
                             BIOCONCENTRATION COEFFICIENTS CORRELATED
                             WITH MOLECULAR STRUCTURES OF THE SURFACTANTS
                             TESTED. [KIKUCHI M, WAKABAYASHIA A; EFFECT
                             OF SURFACTANTS ON AQUATIC ORGANISMS; SEITAI
                             KAGAKU 1 (4): 195-209 (1979)] **UNREVIEWED**
ABSORPTION, DISTRIBUTION     THE UPTAKE, TISSUE DISTRIBUTION, &
 AND EXCRETION               ELIMINATION OF SODIUM LAURYLBENZENESULFONATE
                             WERE INVESTIGATED IN CARP (CYPRINUS CARPIO).
                             CONCN FACTORS FOR HEPATOPANCREAS &
                             GALLBLADDER 30 & 9000 RESPECTIVELY. MAX
                             WHOLE-BODY LEVELS WERE REACHED @ 24-72 HR.
                             UPTAKE INCR WITH INCREASING WATER HARDNESS;
                             SURVIVAL TIME DECR WITH INCR WATER HARDNESS.
                             [WAKABAYASHI M ET AL; BIOACCUMULATION
                             PROFILE OF SODIUM LAURYLBENZENESULFONATE AND
                             SODIUM ALKYL SULFATE IN CARP; CHEMOSPHERE 7
                             (11): 917-24 (1978)] **UNREVIEWED**
ABSORPTION, DISTRIBUTION     UPTAKE IN TEST ORGANISMS (DAPHNIDS AND
 AND EXCRETION               FATHEAD MINNOWS) , AS MEASURED BY (14)CARBON
                             ACTIVITY, WAS FUNCTION OF CHAIN LENGTH &
                             EXPOSURE CONCN. APPROX 100% CLEARANCE WITHIN
                             10 DAYS. [COMOTTO RM ET AL; BIOCONCENTRATION
                             AND METABOLISM OF LINEAR ALKYLBENZENE
                             SULFONATE BY DAPHNIDS AND FATHEAD MINNOWS;
                             ASTM SPEC TECH PUBL (STP 667, AQ TOXICOL):
                             232-50 (1979)] **UNREVIEWED**
ABSORPTION, DISTRIBUTION     WHOLE-BODY AUTORADIOGRAMS SHOWED SURFACTANTS
 AND EXCRETION               ABSORBED BY CARP WERE RAPIDLY DISTRIBUTED
                             THROUGHOUT BODY TISSUES & ORGANS.
                             ELIMINATION WAS RAPID EXCEPT FROM
                             GALLBLADDER. [KIKUCHI M ET AL; UPTAKE,
                             DISTRIBUTION, AND ELIMINATION OF SODIUM
                             LINEAR ALKYLBENZENE SULFONATE AND SODIUM
                             ALKYL SULFATE IN CARP; ECTOLOGICAL ENVIRON
                             SAF 2 (2): 115-27 (1978)] **UNREVIEWED**
ABSORPTION, DISTRIBUTION     IN RATS, BLOOD LEVELS OF
 AND EXCRETION               SODIUM-PARA-DODECYLBENZENESULFONATE WAS MAX
                             @ 2 HR, NEGLIGIBLE @ 48 HR, WHILE EXCRETION
                             RATE OF RADIOACTIVE LABEL WAS 99.4% AFTER 48
                             HR. [SUNAKAWA T ET AL; ABSORPTION,
                             DISTRIBUTION, METABOLISM, AND EXCRETION OF
                             LINEAR ALKYLBENZENE SULFONATE IN RATS;
                             YAKUZAIGAKU 39 (2): 59-68 (1979)]
                             **ACCEPTED**

*** END OF SESSION ***
```

Extract from: Cheminfo Database from CCOHS

CHEMINFO (Chemical Information) Data Base

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……

p-Dioxane

*** IDENTIFICATION ***

CR CHEMINFO RECORD NUMBER: 2289E

CN CCOHS CHEMICAL NAME : p-Dioxane

CN SYNONYM(S) : 1,4-Diethylene Dioxide
1,4-Dioxacyclohexane
1,4-Dioxane
Di(Ethylene Oxide)
Diethylene Ether
Dioxan
Dioxane
Dioxanne
Glycol Ethylene Ether
Tetrahydro-1,4-Dioxin

RN CAS REGISTRY NUMBER : 123-91-1

PN PIN (UN/NA NUMBER(S)) : 1165

CC CIS CHEMICAL CODE(S) : DEMD

MF MOLECULAR FORMULA : C4-H8-O2

LR LAST REVISION DATE : 1986-08-12

*** DESCRIPTION ***

APPEARANCE AND ODOUR: Colourless liquid; ethereal odour

ODOUR THRESHOLD: 2 ppm; 170 ppm

*** OCCUPATIONAL EXPOSURE LIMITS ***

THRESHOLD LIMIT VALUES (TLVs) / AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 1986-87:

TIME WEIGHTED AVERAGE (TLV-TWA): 90 mg/m3 (25 ppm) - Skin

"SKIN" NOTATION: Contact with skin, eyes, and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

NOTE: In many Canadian jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction.

*** FIRE AND EXPLOSION ***

FLASH POINT: 12 deg C (54 deg F)

LOWER EXPLOSIVE LIMIT (LEL): 2.0%

UPPER EXPLOSIVE LIMIT (UEL): 22%

AUTOIGNITION TEMPERATURE: 180 deg C (356 deg F)

* NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD INDEX *

HEALTH:	2 - Hazardous to health.
FLAMMABILITY:	3 - Can be ignited under almost all normal temperature conditions.
REACTIVITY:	1 - Normally stable but can become unstable at elevated temperatures and pressures or may react with water with some release of energy but not violently.

*** PHYSICAL PROPERTIES ***

MOLECULAR WEIGHT: 88.11

CONVERSION FACTOR: 1 ppm = 3.60 mg/m3

MELTING POINT: 10 deg C

BOILING POINT: 101 deg C

RELATIVE DENSITY (SPECIFIC GRAVITY): 1.033 @ 20 deg C (water=1)

SOLUBILITY IN WATER: Miscible

SOLUBILITY IN OTHER LIQUIDS: Miscible with many organic solvents

VAPOUR DENSITY: 3.03 (air=1)

VAPOUR PRESSURE: 30 mm Hg @ 20 deg C

SATURATION VAPOUR CONCENTRATION: 3.9% (148 g/m3) @ 20 deg C

EVAPORATION RATE: 2.7 (butyl acetate = 1)

*** TRANSPORTATION OF DANGEROUS GOODS (TDG) SHIPPING INFORMATION ***
(Source: Transport Canada, Transportation of Dangerous Goods Regulations, Schedules I and II)

TDG CLASSIFICATION: 3.2 - Flammable liquid, flash point not less than -18 deg C but less than 23 deg C.

Note: Records in the CHEMINFO Data Base are built in stages. This record is incomplete. Additional information on this chemical is available from the Inquiries Service of CCOHS.

Information on chemicals contained in the CHEMINFO Data Base is drawn from a number of publicly available sources. The sources used to compile the CHEMINFO Data Base are available on request.

CHAPTER 3

THE LABEL

CONTENTS

Page

3.1 INTRODUCTION 1

- 3.1.1 CHAPTER OBJECTIVES 1
- 3.1.2 WHAT IS A WHMIS LABEL? 2
- 3.1.3 THE SUPPLIER LABEL, THE WORKPLACE LABEL AND OTHER MEANS OF IDENTIFICATION 2
    - 1. THE SUPPLIER LABEL 2
    - 2. THE WORKPLACE LABEL 3
    - 3. OTHER MEANS OF IDENTIFICATION 3

3.2 RESPONSIBILITIES FOR LABELS 4

- 3.2.1 THE SUPPLIER 4
- 3.2.2 THE EMPLOYER 8
- 3.2.3 THE WORKER 12

3.3 LABEL CONTENT, DESIGN AND LOCATION 13

- 3.3.1 SUPPLIER LABELS 14
    - 1. Content Categories Required on Supplier Labels 14
        - • Products which are from Laboratory Supply Houses 14
        - • Products which are Laboratory Samples 15
        - • Other Products 18
    - 2. Details of Content Required on Supplier Labels 19
    - 3. Design, Colour and Application 30
    - 4. Revision of Labels 35
- 3.3.2 THE WORKPLACE LABEL 36
    - 1. Content, Design and Application of Workplace Labels 36
    - 2. Revision of Workplace Labels 37
- 3.3.3 OTHER MEANS OF IDENTIFICATION 38

Page

APPENDICES

A. FEDERAL LABELLING REQUIREMENTS IN CANADA - OTHER THAN WHMIS 40

- A.1 The Hazardous Products Act (Restricted Products) 41
- A.2 Transportation of Dangerous Goods Act 44
- A.3 Pest Control Products Act 56
- A.4 Atomic Energy Control Act 59
- A.5 The Explosives Act 62
- A.6 Food and Drugs Act 64

B. LABELLING REQUIREMENTS AND STANDARDS OUTSIDE CANADA 66

- B.1 Toxic and Hazardous Substances - Hazard Communication Standard (USA) 67
- B.2 European Economic Community Directive on Dangerous Substances (EEC) 69
- B.3 Standard System for the Identification of the Fire Hazards of Materials (NFPA Standard 704) 70
- B.4 American National Standard for Hazardous Industrial Chemicals - Precautionary Labelling (ANSI Standard Z129.1-1982) 72

FIGURES

1 Labelling Decision Sequence for the Supplier 6

2 Labelling Decision Sequence for the Employer 10

3 Content Categories Required on Four Types of Supplier Labels 16

Page

FIGURES (cont'd)

4 WHMIS Class and Division Hazard Symbols 21

5 Examples of Risk Phrases 22

6 Examples of Precautionary Statements 28

7 Acceptable Format for the Supplier Label 31

8 Colour Restrictions for WHMIS Hazard Symbols 33

9 Means of Identification Other than Labels Permitted in WHMIS 39

10 Restricted Product Labels 43

11 Classes and Divisions of Dangerous Goods 46

12 Comparison of the Use of Pictograms in Hazard Symbols Used on WHMIS and TDG Labels 48

13 Label Formats and Colours Required Under the Transportation of Dangerous Goods Regulations 49

14 Sample Label Pursuant to Pest Control Products Act 58

15 Radiation Symbol 61

16 Label Format Pursuant to NFPA Standard 704 71

17 Sample Labels Based on ANSI Standard Z129.1-1982 73

3.1 INTRODUCTION

3.1.1 CHAPTER OBJECTIVES

	Objectives	Location in Chapter 3
1.	To define what is meant by a WHMIS label and distinguish between supplier and workplace labels, and other means of identification.	3.1.2 3.1.3
2.	To define the responsibilities of the supplier, employer and worker for the development and application of labels, and the use of labelled products.	3.2
3.	To describe the circumstances in which different types of supplier labels are required; where products are from laboratory supply houses, are laboratory samples or are products other than these.	3.3.1
4.	To describe four different types of supplier labels, their content, design, application and revision.	3.3.1
5.	To describe the content, design, application and revision of workplace labels.	3.3.2
6.	To describe circumstances in which means of identification other than labels are required in the workplace and their appropriate design.	3.3.3
7.	To review Canadian requirements for labelling other than WHMIS for products likely to be found in the workplace.	Appendix A
8.	To provide information on labelling requirements and standards in Europe and the US for assistance in developing labels.	Appendix B

3.1.2 WHAT IS A WHMIS LABEL?

A WHMIS label is a source of information on a controlled product designed to alert employers and workers, in an easily understood way, to the hazards of the product and the precautions to be taken with it.

A label may be a mark, sign, stamp, device, seal, sticker, ticket, tag or wrapper and must be attached to, or imprinted, stencilled or embossed on the controlled product or a container of the product.

The label is just one element of the WHMIS information delivery system, and directs people to the second element of the system, the material safety data sheet, where more detailed information can be obtained. The third element is the education of workers in hazard information on controlled products, including instruction in the content of the product label, and its meaning and significance.

WHMIS prescribes requirements for the design and use of labels for controlled products, from their initial importation, production or distribution through to their receipt and use in the workplace. However, it is only one of a number of label systems mandated by federal legislation. WHMIS labels must be developed and used in a manner that minimizes the likelihood of conflict with labelling requirements under TDG. Information on non-WHMIS federal label legislation is provided in Appendix A to this Chapter.

3.1.3 THE SUPPLIER LABEL, THE WORKPLACE LABEL AND OTHER MEANS OF IDENTIFICATION

Two types of labels are prescribed under WHMIS legislation: **the supplier label** which is intended for use with controlled products that will be distributed to workplaces in Canada, and the **workplace label** which would be used in some circumstances during the storage, handling and use of controlled products in the workplace. Legislation also provides for the use of **means of identification** other than workplace labels in specific situations where such labels would be impractical or not necessary to ensure worker health and safety.

1. The Supplier Label

The label provided, as a condition of sale, by the supplier of a controlled product. A supplier is a person who is a manufacturer, processor or packager of a controlled product or a person who imports or sells such products.

The supplier label must meet requirements regarding hazard symbols, information categories and label design, format and language. Flexibility is provided in the choice of wording within categories and in label format.

The supplier is responsible for the application of the supplier label to the controlled product unless, under permitted circumstances, the purchaser assumes that responsibility.

Requirements for the availability and design of supplier labels are found in Part II of the Hazardous Products Act and in the pursuant *Controlled Products Regulations*. Regulations under the Canada Labour Code and in the occupational health and safety legislation of provinces and territories prescribe requirements for the use of supplier labels in the workplace and the education of workers in the label system.

2. The Workplace Label

An employer must provide a workplace label for controlled products or containers of controlled products in circumstances such as:

- the production and use of a controlled product in the workplace; or
- the transfer of a controlled product received from a supplier to another container in the workplace.

Workplace labels must include information on product identity and safe handling but considerable flexibility is permitted for label wording and format.

Requirements for workplace labels are found in regulations under the Canada Labour Code, and as adopted in provincial and territorial occupational health and safety legislation.

3. Other Means of Identification

Workplace labels are not required with some portable containers, with transfer or conveyance systems and process or reaction vessels. However, in such cases, other means of identification must be used (warning signs, number or colour codes, piping diagrams, etc.) in combination with worker education to ensure workers are informed of the contents.

3.2 RESPONSIBILITIES FOR LABELS

The supplier, employer and worker each have responsibilities that must be met to ensure the proper implementation of the WHMIS labelling system.

3.2.1 THE SUPPLIER

The Supplier Must:

1. Develop or obtain supplier labels for all controlled products manufactured, processed, packaged, imported or sold by the supplier.

2. Apply appropriate supplier labels to controlled products and all containers of controlled products, except in circumstances (a)-(d) below.

   a) The product is in a container or form intended for export. In this case, the supplier must apply a workplace label or post a placard as per Model OSH Regulations.

   b) The shipment is in bulk. The supplier is exempted from the requirement to apply labels to bulk shipments on the condition that supplier WHMIS label information is sent to the purchaser in one of three forms: on a WHMIS supplier label, a material safety data sheet or in a written statement. If the purchaser is an employer, it then becomes the employer's responsibility to apply a label.

   For the first-time sale of a bulk shipment, the supplier must transmit the label information to the purchaser on or before the date the shipment is received. Label information may accompany shipping documents. For subsequent bulk shipments of the product, the supplier is exempt from sending further information if the purchaser already possesses all the label information and if that information is still valid at the time of sale.

   NOTE: Where information is transmitted on an MSDS or written statement, hazard symbols must be provided, or reference made to the Class, and in case of Class D, the Divisions, to permit the purchaser to determine the WHMIS hazard symbol(s) appropriate to the product.

   c) The product is imported for the purposes of labelling or repacking. (Reference: CPR, Section 23)

   The importer is exempt from the requirement to have a label applied to the package of the imported product prior to its use or sale if the importer provides information and, where requested, a sample of the product to an inspector in each province where the product is imported. One item of required information is the **"nature"** of the controlled product which means a product identifier and a general description of the type of product (e.g. acid, base, biological hazard, flammable gas, organic solvent).

Where a controlled product is imported under this exemption, it must be brought into compliance with WHMIS label requirements before being used or sold in Canada. The importer must either apply the proper label, or where the importer imports a product directly to a third party, it is the responsibility of the third party to apply the WHMIS label -- but only if the third party has notified the importer in writing that he or she will assume that responsibility.

d) When controlled products are distributed in multi-container shipments (i.e. with inner and outer containers), the supplier does not have to apply a label to:

- an inner container if the outer container bears a WHMIS supplier label and the supplier has received a written commitment from the purchaser to apply supplier labels to the inner container;
- a package liner* of the controlled product;
- the outer container, if the WHMIS label on an inner container is visible and legible through the outer container under normal conditions of storage and handling (e.g. inner containers shrink-wrapped in clear plastic); or
- the outer container, if the outer container has a label applied to it in accordance with TDG Regulations. **(NOTE: The inner container(s) in this case must each bear a WHMIS supplier label.)**

Supplier responsibilities to develop and apply labels are summarized in the Decision Tree shown in Figure 1. **(NOTE: Four different types of supplier labels are prescribed by CPR depending on whether the product is from a laboratory supply house, whether it is a laboratory sample, its weight and its volume.)** See Part 3.3.1 of this Chapter for detailed information on supplier label content, design and application.

---

* A package liner is a special case of an inner container which would normally be kept in the outer container during product storage and use; for example, a plastic bag used to contain powder in a box. If the product is intended to be stored and used from the plastic bag alone, the bag would not be considered to be a package liner and would require WHMIS labelling.

FIGURE 1

LABELLING DECISION SEQUENCE FOR THE SUPPLIER

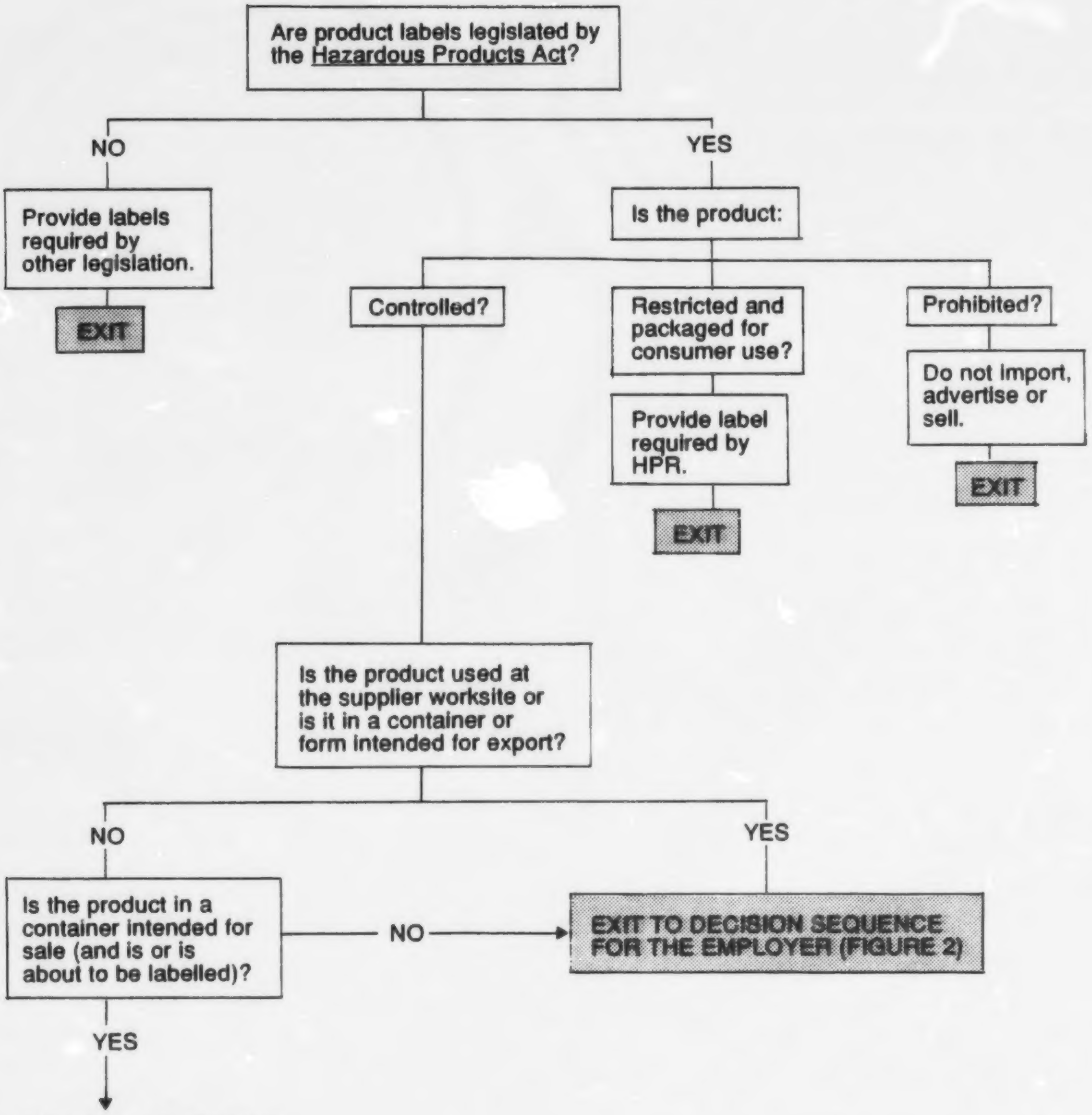
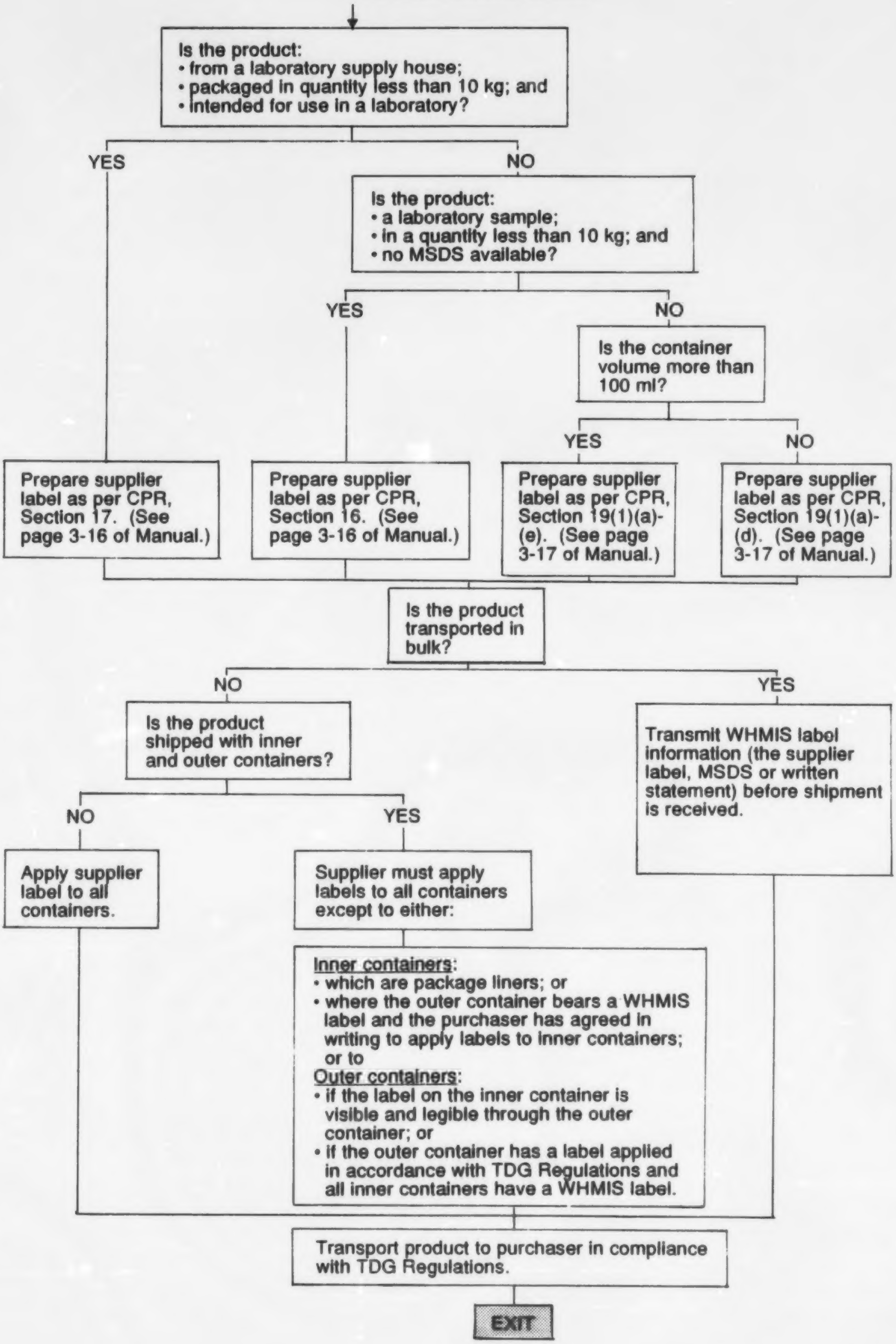

Are product labels legislated by the Hazardous Products Act?
NO
YES
Provide labels required by other legislation.
EXIT
Is the product:
Controlled?
Restricted and packaged for consumer use?
Prohibited?
Provide label required by HPR.
EXIT
Do not import, advertise or sell.
EXIT
Is the product used at the supplier worksite or is it in a container or form intended for export?
NO
YES
Is the product in a container intended for sale (and is or is about to be labelled)?
NO
EXIT TO DECISION SEQUENCE FOR THE EMPLOYER (FIGURE 2)
YES

FIGURE 1 CONTINUED ON NEXT PAGE . . .

FIGURE 1 CONTINUED


Is the product:
• from a laboratory supply house;
• packaged in quantity less than 10 kg; and
• intended for use in a laboratory?
YES
NO
Is the product:
• a laboratory sample;
• in a quantity less than 10 kg; and
• no MSDS available?
YES
NO
Is the container volume more than 100 ml?
YES
NO
Prepare supplier label as per CPR, Section 17. (See page 3-16 of Manual.)
Prepare supplier label as per CPR, Section 16. (See page 3-16 of Manual.)
Prepare supplier label as per CPR, Section 19(1)(a)-(e). (See page 3-17 of Manual.)
Prepare supplier label as per CPR, Section 19(1)(a)-(d). (See page 3-17 of Manual.)
Is the product transported in bulk?
NO
YES
Is the product shipped with inner and outer containers?
Transmit WHMIS label information (the supplier label, MSDS or written statement) before shipment is received.
NO
YES
Apply supplier label to all containers.
Supplier must apply labels to all containers except to either:
Inner containers:
• which are package liners; or
• where the outer container bears a WHMIS label and the purchaser has agreed in writing to apply labels to inner containers; or to
Outer containers:
• if the label on the inner container is visible and legible through the outer container; or
• if the outer container has a label applied in accordance with TDG Regulations and all inner containers have a WHMIS label.
Transport product to purchaser in compliance with TDG Regulations.
EXIT

3.2.2 THE EMPLOYER

The Employer Must:

1. Ensure that all workers who work with or in proximity to controlled products are instructed in the content, purpose and significance of supplier and workplace labels, and other identifiers. Instruction will ensure workers know procedures for the safe use, storage, handling and disposal of controlled products, including procedures to be followed where fugitive emissions are present or in the event of emergency involving a controlled product. (See Chapter 5 of this Manual for discussion of worker education.)

2. Ensure that a controlled product or the container of a controlled product has a proper label applied to the item at the time of entry into the workplace. The employer must affix the supplier label:

    - to inner containers if the shipment is multi-container and the employer has agreed in writing with the supplier to apply labels to inner containers;

    - to imported products where the employer has imported the product for use at the employer's worksite; and

    - to bulk shipments, unless, pursuant to Section 15 of CPR, the supplier provides an MSDS or a statement of label information instead of a supplier label for a controlled product, in which case the employer may affix a workplace label.

3. Ensure that no controlled product is used or handled in the workplace without the proper applied label. If a controlled product is received from a supplier without a proper label the employer may store the product only, while actively seeking supplier label information.

4. Take measures; for example, through worker education, to ensure that supplier labels are not removed, defaced or altered in the workplace.

5. Develop and apply workplace labels to controlled products or containers of controlled products where:

    - the employer produces a controlled product in the workplace -- except where the product is a hazardous waste, fugitive emission, is produced in a laboratory solely for research and development work in the laboratory, is in a container or form intended for export, or is in a container that is intended for sale or disposition and is or is about to be* appropriately labelled;

*** NOTE: "about to be" is generally understood to mean within one work shift.**

- an existing supplier label becomes illegible or is accidentally removed and a replacement supplier label is not available;
- a controlled product is transferred to another container (including a storage tank) unless:
    - the new container is to be used only in a laboratory; or
    - the container is portable, clearly identified as to contents, filled directly from a labelled container and is either required for immediate use,* or is under the control of the employee who filled it and used only by that employee during the shift in which it was filled;
- in the case of a bulk shipment, the supplier does not provide a supplier label pursuant to Section 15 of CPR.

6. Provide other means (modes) of identification, which need not be workplace labels but which clearly identify contents, for any product which is:

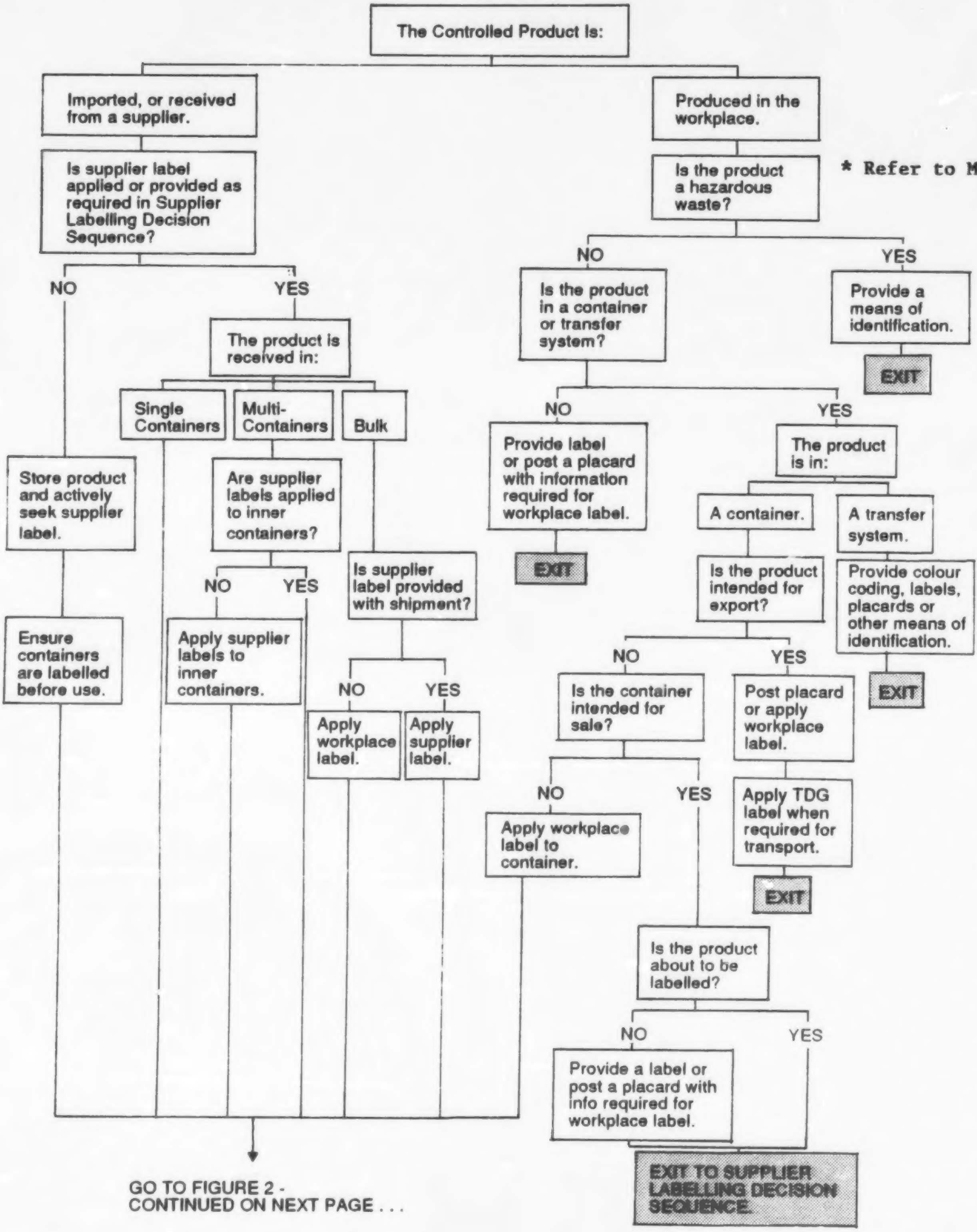
- a hazardous waste (other than a fugitive emission) produced in the workplace;
- contained in a transfer or reaction system such as a pipe or piping system, process or reaction vessel, tank car or tank truck, ore car, conveyor belt or similar conveyance;
- transferred to a new container which is:
    - to be used only in a laboratory; or
    - which is portable, filled directly from a labelled container and under the control of the employee who filled it and is used only by that employee during the shift in which it was filled (products required for immediate use -- i.e. for use at once, without delay do not need to be provided with identification);
- a mixture, or substance undergoing analysis, test or evaluation in a laboratory (including products produced in a laboratory for research and development work in the same lab).

7. Provide and post a placard which need not be a label but which discloses the information required for a workplace label and is of a size and in such location that placard information is conspicuous and clearly legible to workers when a controlled product is:

- not in a container; or is
- in a container or form intended for export; or is

FIGURE 2

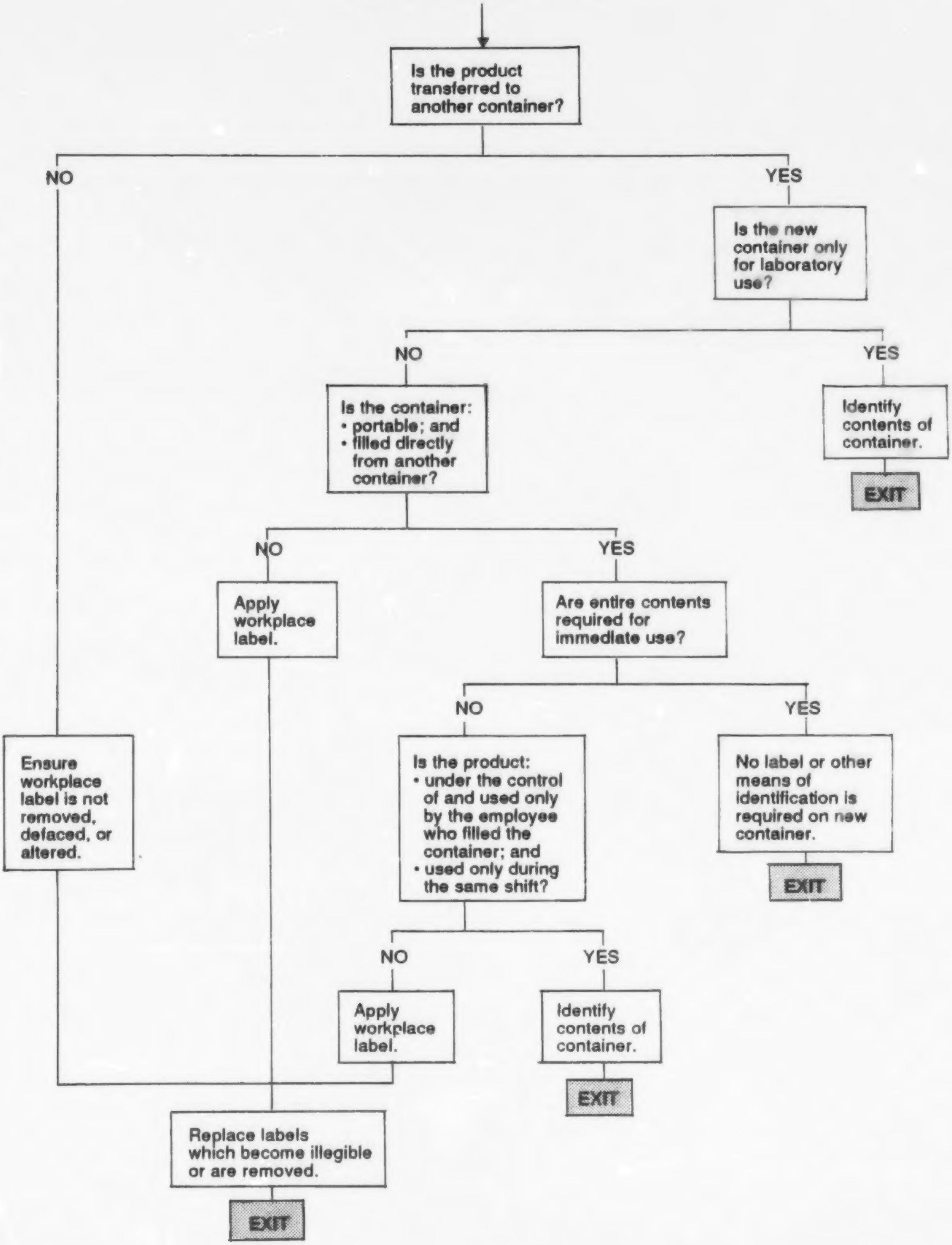
LABELLING DECISION SEQUENCE FOR THE EMPLOYER


The Controlled Product Is:
Imported, or received from a supplier.
Is supplier label applied or provided as required in Supplier Labelling Decision Sequence?
NO
YES
Store product and actively seek supplier label.
Ensure containers are labelled before use.
The product is received in:
Single Containers
Multi-Containers
Bulk
Are supplier labels applied to inner containers?
NO
YES
Apply supplier labels to inner containers.
Is supplier label provided with shipment?
NO
YES
Apply workplace label.
Apply supplier label.
Produced in the workplace.
Is the product a hazardous waste?
NO
YES
Provide a means of identification.
EXIT
Is the product in a container or transfer system?
NO
YES
Provide label or post a placard with information required for workplace label.
EXIT
The product is in:
A container.
A transfer system.
Provide colour coding, labels, placards or other means of identification.
EXIT
Is the product intended for export?
NO
YES
Post placard or apply workplace label.
Apply TDG label when required for transport.
EXIT
Is the container intended for sale?
NO
YES
Apply workplace label to container.
Is the product about to be labelled?
NO
YES
Provide a label or post a placard with info required for workplace label.
EXIT TO SUPPLIER LABELLING DECISION SEQUENCE

* Refer to MR53/88

GO TO FIGURE 2 -
CONTINUED ON NEXT PAGE . . .

FIGURE 2 CONTINUED


Is the product transferred to another container?
NO
YES
Is the new container only for laboratory use?
NO
YES
Is the container:
• portable; and
• filled directly from another container?
Identify contents of container.
EXIT
NO
YES
Apply workplace label.
Are entire contents required for immediate use?
NO
YES
Ensure workplace label is not removed, defaced, or altered.
Is the product:
• under the control of and used only by the employee who filled the container; and
• used only during the same shift?
No label or other means of identification is required on new container.
EXIT
NO
YES
Apply workplace label.
Identify contents of container.
EXIT
Replace labels which become illegible or are removed.
EXIT

- in a container intended for sale to be labelled at a later time,* in the normal course of the employer's business and without undue delay.

Employer responsibilities to develop and apply labels or other means of identification are summarized in the Decision Tree in Figure 2. Parts 3.3.2 and 3.3.3 of this Chapter provide detailed information on the content, design and application of workplace labels and other means of identification.

3.2.3 THE WORKER

The Worker Must:

1. Know and understand:
    - the content required on supplier labels and workplace labels, including the requirement for information on the availability of a material safety data sheet;
    - the significance of information on labels and other means of identification for worker health and safety; and
    - resulting procedures for the safe use, storage, handling and disposal of controlled products as well as procedures to be followed where fugitive emissions are present or in the event of emergency involving a controlled product.
2. Handle controlled products in accordance with label and identifier alerts.
3. Follow employer directives to avoid removing, defacing or altering labels.
4. Inform employers of the presence of illegible labels and other means of identification or those which have been accidentally removed.

*** NOTE: "at a later time" is generally understood to be longer than one work shift.**

3.3 LABEL CONTENT, DESIGN AND LOCATION

Requirements for the content and design of labels on controlled products depend on:

- whether the label is a supplier or workplace label;
- the volume of the container if the product is provided by a supplier; and
- the weight of the product, if the product is meant for laboratory use.

The common content elements to all labels irrespective of the source, use or dimensions of controlled products are:

- the product identifier; and
- a statement indicating that a material safety data sheet is available if the data sheet is required or is otherwise available.

The most significant differences in label content and format are between supplier and workplace labels. In general, requirements for supplier labels are more stringent than for workplace labels in the sense that:

- more content areas must be addressed;
- hazard symbols must be used;
- a prescribed border must surround the label; and
- required statements and phrases must always be provided in both official languages.

The content, design and location of labels are discussed in this Chapter for each of the supplier label, the workplace label and other means of identification.

3.3.1 SUPPLIER LABELS

The categories of information which must appear on different types of supplier labels are discussed, followed by the details of information which must appear in each category, the design, colour and application of the label and the revision of labels.

1. Content Categories Required on Supplier Labels

Most WHMIS supplier labels found in commerce will display seven categories of information: the product identifier, supplier identifier, a statement that an MSDS is available, hazard symbols, risk phrases, precautionary measures and first aid measures.

However, some products from laboratory supply houses, products which are laboratory samples and other products sold in very small containers may be permitted to display labels with fewer categories.

Figure 3 summarizes the circumstances in which different types of supplier labels are permitted and the categories of information required for each.

To help with the interpretation of Figure 3, the following points apply.

Products which are from Laboratory Supply Houses

- Products from a laboratory supply house, packaged in quantities of less than 10 kilograms and intended for use in a laboratory are excluded from requirements to provide, on the supplier label a distinctive WHMIS border, a supplier identifier, hazard symbols as set out in Schedule II of CPR, and a statement that a material safety data sheet is available (unless the data sheet is available). **NOTE: If a data sheet is not available, the label must disclose the information required on the data sheet.**
- A **laboratory** is a place devoted to experimental study in any branch of natural science or to the application of scientific principles in testing and analysis. A laboratory includes non-traditional settings such as field testing locations, with or without a temporary enclosure, production line testing stations, etc.
- A laboratory supply house is an organization which supplies products to laboratories.

- The intention that a product be used in a laboratory can be established with a statement on the label; for example, "Intended for Laboratory Use Only". Four grades of chemical are normally produced by laboratory supply houses, termed technical, reagent, ACS and analytical grades. Products intended for lab use and which display the modified lab supply house label are not to be used outside laboratories.

- There is nothing in CPR which prohibits a laboratory supply house from providing more than the minimum information categories shown in Figure 3(1).

Products which are Laboratory Samples

- A laboratory sample is a sample of a controlled product that is intended solely to be tested in a laboratory for purposes such as analysis, research and development, etc. It does not include any sample of a controlled product that is to be used:

    - by the laboratory for testing other products, materials or substances; or

    - for educational or demonstration purposes; or

    - for marketing purposes.

- A laboratory sample of a controlled product for which a material safety data sheet has not been obtained or prepared, when packaged in a container that contains less than 10 kilograms of the controlled product, is exempt from requirements to display hazard symbols, risk phrases, precautionary and first aid statements if other statements and an emergency telephone number are provided as shown in Figure 3.

NOTE: Where a laboratory sample is intended for use in research and development, it is recommended that the label include the statement:

> **"Research and Development Sample. For Laboratory Use Only. Echantillon pour Recherche et Développement. Pour Utilisér Seulement Dans un Laboratoire."**

The intent of this statement is to minimize the likelihood that such a sample would be used inadvertently outside the laboratory.

- A laboratory sample must be "of a controlled product"; for example, bulk samples taken directly from solid or liquid controlled products or where drawn as a gas into a sample cylinder from a pressurized line.

FIGURE 3

CONTENT CATEGORIES REQUIRED ON FOUR TYPES OF SUPPLIER LABELS

1. PRODUCTS FROM LABORATORY SUPPLY HOUSES

(Reference: CPR, Section 17)

For products which are:

- from a laboratory supply house;
- packaged in quantities of less than 10 kilograms; and
- intended for use in a laboratory.

The label must disclose:

- the product identifier;
- where a material safety data sheet is available, a statement to that effect (if a data sheet is not available, the label must disclose the information required on the data sheet);
- risk phrases appropriate to the controlled product or to the Classes, Divisions or Subdivisions in which the controlled product falls;
- precautionary measures to be followed when handling, using or being exposed to the controlled product; and
- where appropriate, first aid measures to be taken in case of exposure to the controlled product.

2. PRODUCTS WHICH ARE LABORATORY SAMPLES

(Reference: CPR, Section 16)

For products which are:

- laboratory samples; and
- packaged in a container of less than 10 kilograms of the controlled product, and are samples of controlled products for which a material safety data sheet has not been obtained or prepared.

The label must disclose:

- the product identifier;
- the supplier identifier;
- the chemical identity or generic chemical identity of any ingredient of the controlled product referred to in subparagraphs 13(a) (i)-(iv) of the Hazardous Products Act, if known by the supplier; and
- an emergency telephone number of the supplier to appear in the statement "Hazardous Laboratory Sample. For hazard information or in an emergency, call ____________________ / Echantillon pour laboratoire de produit dangereux. Pour obtenir des renseignments sur les dangers ou en cas d'urgence, composer ____________."

3. PRODUCTS OTHER THAN TYPES 1 OR 2,* IN CONTAINERS MORE THAN 100 ML IN VOLUME

(Reference: CPR, Section 19[1][a]-[e])

The label must disclose:

- the product identifier;
- the supplier identifier;
- a statement that a material safety data sheet is available;
- hazard symbols set out in CPR, Schedule II, that correspond with the Classes and Divisions in which the product falls;
- risk phrases that are appropriate to the controlled product or the Classes, Divisions or Subdivisions in which the controlled product falls;
- precautionary measures to be followed when handling, using or being exposed to the controlled product; and
- where appropriate, first aid measures to be taken in case of exposure to the controlled product.

4. PRODUCTS OTHER THAN TYPES 1 OR 2,* IN CONTAINERS 100 ML OR LESS IN VOLUME

(Reference: CPR, Section 19[1][a]-[d])

The label must disclose:

- the product identifier;
- the supplier identifier;
- a statement that a material safety data sheet is available;
- hazard symbols set out in CPR, Schedule II, that correspond with the Classes and Divisions in which the product falls;

*** NOTE: The supplier of laboratory chemicals or samples may use labels shown for types 3 and 4 but is not obligated to do so.**

- In some cases, samples intended for lab testing will not be subject to WHMIS supplier information requirements; for example:
    - Air samples of decomposition products, oxidized by-products or other altered forms of the controlled product.
    - Samples of poisonous materials which are not likely to contain a concentration of controlled product that meets cut-off criteria (of one per cent or 0.1 per cent) for inclusion in WHMIS. For example, it is unlikely that a blood or urine sample taken from a worker to evaluate exposure to inorganic lead would ever contain lead at a level above the criterion level of one per cent.
    - Samples collected and analyzed within one organization. In such cases, samples are not "distributed" by a supplier to an employer and are not required to display a supplier label. **If the sample of controlled product is tested in an in-house lab, the sample label requires a product identifier only.**
- Where a supplier is not certain if the sample contains a controlled product sufficient to merit inclusion in WHMIS, the following generalizations apply:
    - Where repeated sampling is carried out, the assessment of the sample can be based on previous test results from similar samples. (Reference: CPR, Section 33[1]).
    - Where the sample is suspected of containing a biohazardous infectious material, the sample is considered to fall within WHMIS on the basis of the supplier using "information of which (he/she) is aware or ought reasonably to be aware". (Reference: CPR, Section 33[2]).

Products Other Than Laboratory Samples or Products from Laboratory Supply Houses

Most controlled products distributed in commerce are neither laboratory samples nor from laboratory supply houses. Such products must disclose the seven categories of information shown in Figure 3(3) if in containers more than 100 millilitres in volume; the four categories shown in Figure 3(4) if in containers of 100 ml or less.

However, under the Hazardous Materials Information Review Act, an employer or supplier may apply to withhold two categories of information from such labels:

- the product identifier in the form of a chemical name, brand name, common name, generic name or trade name; or
- information that could be used to identify the supplier of a controlled product.

Where such an application is made, the labels must provide a code name or code number specified by the supplier, and if an exemption is granted, a statement to that fact and the date of the decision to grant the exemption. (Reference: CPR, Sections 19[2], 26, 27). See Chapter 6 for discussion of WHMIS trade secret provisions.

2. Details of Content Required on Supplier Labels

Details are provided here of the content required within each of the information categories which may appear on supplier labels: the product identifier, supplier identifier, reference to the MSDS, hazard symbols, risk phrases, precautionary measures, first aid measures and, for lab samples, the emergency telephone number.

a) Product Identifier - The identification of a product includes any of: the common name, chemical name, trade name, generic name, or brand name. Where an application is made for an exemption to provide such identifiers under the Hazardous Materials Information Review Act, the label must provide a code name or code number specified by the supplier. Product identifiers disclosed on the label must be identical to the product identifier on the material safety data sheet.

b) Supplier Identifier - This includes the name of the supplier and the city where the principal place of business is located.

Where a controlled product is sold to a distributor for the purpose of sale or resale, the distributor is not required to disclose the supplier identifier of the distributor if the supplier identifier of the manufacturer or importer is disclosed on the label.

Conversely, where a controlled product is packaged for a distributor by a manufacturer, the manufacturer is not required to disclose the supplier identifier of the manufacturer if the supplier identifier of the distributor is disclosed on the label.

c) Reference to the MSDS - The following statements, or their equivalents, must appear on the WHMIS supplier label, when a material safety data sheet is required or otherwise available.
"SEE MATERIAL SAFETY DATA SHEET"
"VOIR LA FICHE SIGNALÉTIQUE"

d) Hazard Symbol - Hazard symbols in WHMIS are composed of a variety of pictograms such as the cylinder, flame, skull and crossbones, etc. surrounded by a circular border. Required symbols are shown in Schedule II of the *Controlled Products Regulations* and are reproduced in Figure 4 on page 3-21. Hazard symbols must:

- except with respect to size and colour, be an exact reproduction of the symbols depicted in Schedule II; and
- be displayed in a colour that is not likely to create confusion with a safety mark required by Part V of the Transportation of Dangerous Goods Regulations; and
- be legible.

Colour and legibility are discussed in "Design, Colour and Application", pages 3-30 to 3-35.

WHMIS symbols are generally compatible with those required under the TDG Act, and symbol systems of the European Economic Community and the International Labour Organization.

There is no recognized symbol in other legislation for DANGEROUSLY REACTIVE MATERIAL and therefore a WHMIS symbol for this Class has been developed. Similarly, the stylized "T" symbol for Division 2 of WHMIS Class D has been developed, primarily for recognition of chronic health hazards.

NOTE: The skull and crossbones symbol applies to Division 1 of Class D, "Materials Causing Immediate and Serious Toxic Effects". However, under Section 19(5) of CPR, the supplier of a product which falls into both Divisions 1 and 2 of Class D is permitted to display only the hazard symbol for Division 1, i.e. the skull and crossbones.

e) Risk Phrase(s) - The Risk Phrase(s) contained on the supplier label is to be performance based, with the exact wording being the responsibility of the supplier who carried out the evaluation of the material in question.

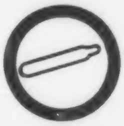
Examples of Risk Phrase(s) which a supplier may wish to use are shown in Figure 5 on page 3-22.

FIGURE 4

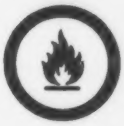
WHMIS CLASS AND DIVISION HAZARD SYMBOLS

CLASS AND DIVISION DESIGNATION **SYMBOLS**

CLASS A - COMPRESSED GAS

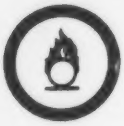


CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL



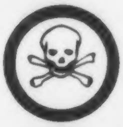
1. Flammable Gas
2. Flammable Liquid
3. Combustible Liquid
4. Flammable Solid
5. Flammable Aerosol
6. Reactive Flammable Material

CLASS C - OXIDIZING MATERIAL

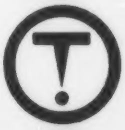


CLASS D - POISONOUS AND INFECTIOUS MATERIAL

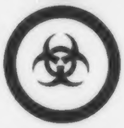
1. Materials Causing Immediate and Serious Toxic Effect



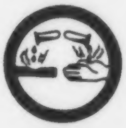
2. Material Causing Other Toxic Effects



3. Biohazardous Infectious Material



CLASS E - CORROSIVE MATERIAL



CLASS F - DANGEROUSLY REACTIVE MATERIAL

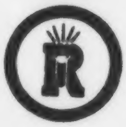


FIGURE 5

EXAMPLES OF RISK PHRASES

ENGLISH VERSION

COMPRESSED GAS

FLAMMABLE AND COMBUSTIBLE MATERIAL

- Flammable Gas
- Flammable Liquid
- Combustible Liquid
    - In use, may form explosive vapour-air mixture.
- Flammable Solid
    - May form flammable dust-air mixture.
- Flammable Aerosol
- Reactive Flammable Material
    - Contact with water liberates flammable gas.
      Spontaneously flammable in air.

OXIDIZING MATERIAL

- Risk of explosion by shock, friction, fire or other sources of ignition.
- Contact with combustible material may cause fire.
- Explosive when mixed with combustible material.

POISONOUS AND INFECTIOUS MATERIAL

- Very Toxic:
    - Rapidly absorbed through skin.

FIGURE 5

EXAMPLES OF RISK PHRASES

FRENCH VERSION

GAZ COMPRIMÉS

MATIÈRE COMBUSTIBLE ET INFLAMMABLE

Gaz Inflammable

Liquide Inflammable

Liquide Combustible

Susceptible de former un mélange de vapeur-air explosif à l'usage.

Solide Inflammable

Peut former un mélange poussière-air inflammable.

Aérosol Inflammable

Matière Inflammable Réactive

Le contact avec l'eau dégage des gaz inflammables.
Spontanément inflammable dans l'air.

MATIÈRE COMBURANTE

Risque d'explosion par le choc, la friction, le feu ou autres sources d'ignition.
Le contact avec une matière combustible peut engendrer un incendie.
Explosif lorsque mélangé avec une matière combustible.

MATIÈRE TOXIQUE ET INFECTIEUSE

Très Toxique:

Rapidement absorbé par la peau.

FIGURE 5 CONTINUED

EXAMPLES OF RISK PHRASES

ENGLISH VERSION

POISONOUS AND INFECTIOUS MATERIAL

Very Toxic:

Danger of cumulative effects.
Danger of very serious irreversible effects.
May cause cancer.
May cause heritable genetic damage.
May cause birth defects.
Danger of serious damage to health by prolonged exposure.
Lung sensitizer.
May cause delayed lung injury.
May cause delayed skin injury.
May cause delayed eye injury.
May cause blindness (not related to corrosivity).

Toxic:

Eye irritant.
Lung irritant.
Skin irritant.
Danger of irreversible effects.
Skin sensitizer.

Biohazardous Infectious Material

CORROSIVE MATERIAL

Causes burns.
Causes severe burns.
Liquid or vapour causes burns which may be delayed.

DANGEROUSLY REACTIVE MATERIAL

Risk of explosion by shock, friction, fire or other sources of ignition.

Risk of explosion if heated under confinement.
Explosive when dry.
Heating may cause an explosion.
Explosive with or without contact with air.
May cause fire.
Reacts violently with water.
Contact with water liberates very toxic gas.
Can become highly flammable in use.

SPECIAL RISKS

Forms very sensitive explosive metallic compounds.
Explosive when mixed with oxidizing substances.
May form explosive peroxides.
Contact with acids liberates toxic gas.
Contact with acids liberates very toxic gas.

FIGURE 5 CONTINUED

EXAMPLES OF RISK PHRASES

FRENCH VERSION

MATIÈRE TOXIQUE ET INFECTIEUSE

Très Toxique:

Risque d'entraîner des effets cumulatifs.
Risque d'entraîner de très graves effets irréversibles.
Susceptible d'être cancérigène.
Peut entraîner des dommages génétiques héréditaires.
Peut causer des malformations congénitales.
L'exposition prolongée risque d'entraîner de graves dommages à la santé.
Agent sensibilisateur des poumons.
Susceptible d'entraîner des lesions pulmonaires à retardement.
Susceptible d'entraîner des lesions cutanées à retardement.
Susceptible d'entraîner des lesions aux yeux à retardement.
Susceptible d'entraîner la cécité (sans rapport avec le degré de corrosion).

Toxique:

Irritant pour les yeux.
Irritant pour les poumons.
Irritant pour la peau.
Risque d'entraîner des effets irréversibles.
Agent sensibilisateur de la peau.

Matière Infectieuse

MATIÈRE CORROSIVE

Provoque des brûlures.
Provoque de graves brûlures.
Liquide ou vapeur susceptible d'entraîner des brûlures à retardement.

MATIÈRE DANGEREUSEMENT REACTIVE

Risque d'explosion par le choc, la friction, le feu ou autres sources d'ignition.
Risque d'explosion si exposé à la chaleur dans un espace restreint.
Explosif à l'état sec.
Danger d'explosion sous l'action de la chaleur.
Explosif en contact ou sans contact avec l'air.
Peut provoquer un incendie.
Réagit violemment en contact avec l'eau.
En contact avec l'eau, dégage un gaz très toxique.
Susceptible de devenir très inflammable à l'usage.

RISQUES SPECIAUX

Forme des compositions métalliques explosives et très sensibles.
Peut exploser si mélangé avec des matières comburantes.
Susceptible de former des peroxides explosifs.
En contact avec un acide, dégage un gaz toxique.
En contact avec l'acide, dégage un gaz très toxique.

Phrases are based on the European Economic Council Directive on the Classification, Packaging and Labelling of Dangerous Substances, June 27, 1967, and the American National Standard for Hazardous Industrial Chemicals - Precautionary Labelling. These documents represent the most comprehensive lists of phrases available.

As a general rule, risk phrases are based on professional judgement and reflect the criteria in the WHMIS Classes, Divisions and Subdivisions that bring the product into the WHMIS system. For example, the appropriate risk phrase for a product which is brought into WHMIS because it is a lung sensitizer (Division 2 of Class D) is:

> "Very Toxic: Lung Sensitizer. Très Toxique: Agent sensibilisateur des poumons."

However, if a risk phrase is redundant because it adds no information other than that already provided by the hazard symbol and precautionary measures, it need not be used. For example, a product which is moderately corrosive to the skin and which displays a label with the Corrosive symbol and precautionary statements "Avoid prolonged or repeated contact with the skin", "Wear suitable gloves", etc., may not have to display the risk phrase "causes burns".

On the other hand, a product which is brought into WHMIS for reason of cancer-causing properties will display not only the stylized "T" symbol for Class D-2 and precautionary statements but also a risk phrase regarding the cancer hazard where there is any risk of exposure. The stylized "T" symbol alone does not provide information on which of the seven different types of health effects included in the Division was responsible for the product being included in WHMIS.

NOTE: In certain cases, a material may pose a special risk not directly related to the reason for which the material is included in the WHMIS. For example, isopropyl ether, a flammable liquid (Class B-2), can form explosive peroxides during storage, and merits the additional special risk phrase "May form explosive peroxides. Susceptible de former des peroxides explosifs."

f) Precautionary Measures - The precautionary measures contained on the supplier label are to be performance based, with the exact wording being the responsibility of the supplier who carried out the evaluation of the material in question.

Figure 6 on page 3-28 provides examples of precautionary measure statements which a supplier may wish to use. These are intended to describe the essential precautions to be taken in the handling, use and storage of hazardous materials.

g) First Aid Measures - Suppliers are required to develop first aid statements, where appropriate, based on the hazard data available on the product, which describe the immediate measures to be taken by the victim or co-workers, that are specific to the product but which do not include additional measures to be taken only by a medical professional.

h) Emergency Telephone Number (For Laboratory Samples) - Emergency telephone numbers should be operational on a 24-hour basis and be checked at intervals to ensure proper operation. Labels must be updated in the event of change of the emergency number.

NOTE: The information which must be disclosed on a label must not be disclaimed or contradicted by any other information not required under the Hazardous Products Act and disclosed on the label, material safety data sheet, the controlled product or the container.

FIGURE 6

EXAMPLES OF PRECAUTIONARY STATEMENTS

ENGLISH VERSION

Keep in a cool place.
Keep contents under . . . (appropriate liquid to be specified by the supplier).
Keep under . . . (inert gas to be specified by the supplier).
Keep container tightly closed.
Keep container dry.
Keep container in a well-ventilated place.
Do not keep the container sealed.
Keep away from . . . (incompatible materials to be indicated by the supplier).
Keep away from heat.
Keep away from sources of ignition -- no smoking.
Keep away from combustible material.
Handle and open container with care.
When using, do not smoke.
Do not breathe dust.
Do not breathe gas/fume/vapour/spray.
Avoid contact with skin.
Avoid contact with eyes.
Do not empty into drains.
Never add water to this product.
Take precautionary measures against static discharges.
Avoid shock and friction.
Wear suitable protective clothing.
Wear suitable gloves.
In case of insufficient ventilation, wear suitable respiratory equipment.
Wear eye/face protection.
In case of fire and/or explosion, do not breathe fumes.
In case of fire, use . . . (Indicate in the space the precise type of firefighting equipment. If water increases the risk, add the phrase "never use water".)
During fumigation/spraying, wear suitable respiratory equipment.
If you feel ill, seek medical advice. (Show on label where possible.)
In case of accident or if you feel ill, seek medical advice immediately. (Show on label where possible.)
Avoid prolonged or repeated contact with skin.
Avoid prolonged or repeated breathing of vapour.
This gas deadens the sense of smell. Do not depend on odour to detect presence of gas.

FIGURE 6

EXAMPLES OF PRECAUTIONARY STATEMENTS

FRENCH VERSION

Tenir au frais.

Conserver le contenu sous . . . (nom du liquide approprié à préciser par le fournisseur).

Conserver sous . . . (nom du gaz inerte à préciser par le fournisseur).

Tenir le contenant bien fermé.

Tenir le contenant dans un endroit sec.

Tenir le contenant dans un endroit bien ventilé.

Ne pas fermer hermétiquement le récipient.

Tenir éloigné de . . . (nom des matières incompatibles à préciser par le fournisseur).

Tenir à l'abri de la chaleur.

Tenir à l'écart des flammes et des étincelles -- ne pas fumer.

Tenir à l'écart des matières combustibles.

Ouvrir et manipuler le récipient avec prudence.

Ne pas fumer pendant l'utilisation.

Eviter de respirer les poussières.

Eviter de respirer les gaz/fumées/vapeurs/brouillards de pulvérisation.

Eviter le contact avec la peau.

Eviter le contact avec les yeux.

Ne pas jeter les résidus à l'égout.

Ne jamais ajouter d'eau à ce produit.

Prendre des mesures de prévention contre les décharges électrostatiques.

Eviter le choc et le frottement.

Porter un vêtement de protection approprié.

Porter des gants appropriés.

En cas de ventilation insuffisante, se protéger au moyen d'un appareil respiratoire approprié.

Porter un appareil de protection pour les yeux et le visage.

En cas d'incendie et/ou d'explosion, évitez d'inhaler les fumées.

En cas d'incendie, utiliser . . . (Indiquer dans l'espace le genre de matériel anti-incendie. Si l'eau augmente le risque, ajouter: Ne jamais utiliser d'eau.)

Pendant les fumigations/vaporisations, se protéger au moyen d'un appareil respiratoire approprié.

En cas de malaise, faire appel au médecin. (Apporter l'étiquette avec soi si c'est possible.)

En cas d'accident ou de sensation de malaise, consulter immédiatement un médecin. (Apporter l'étiquette avec soi si c'est possible.)

Eviter tout contact prolongé ou répété avec la peau.

Eviter toute inhalation prolongée ou répétée des vapeurs.

Ce gaz diminue l'acuité olfactive. Ne vous fiez pas à votre odorat pour détecter la présence d'un gaz.

3. Design, Colour and Application

Design and application considerations include: language, layout and borders, colour, legibility, durability, and location of the label on the container.

a) Language - Information which must be disclosed on the supplier label shall be disclosed in English and in French.

b) Layout and Borders - All content categories required for supplier labels must be within a border of the exact design shown in Schedule III of CPR and reproduced in Figure 7, except that English content may appear within one border and French within another. Separate language labels must each contain all the required hazard symbols.

The requirement for the use of the distinctive border applies to all types of supplier labels except those which are for controlled products from laboratory supply houses, packaged in quantities of less than 10 kg and intended for use in a lab. For such products no border is necessary.

Information not required by WHMIS to be on the supplier label should not appear within the border, although additional WHMIS symbols can be used outside it. There is flexibility permitted for the location of required content categories within the border. For guidance, an acceptable format is shown in Figure 7.

The corners of the border must be square, not round. Hash marks must be parallelogram in shape, slanted as shown in Figure 7 and prominent. Some flexibility is permitted for the spacing between hash marks and length versus width proportions. Border hash marks may not have words on them. The border may appear on a label affixed to the container or on the container itself.

c) Colour - Letters, numbers and borders that appear on labels may be in any colour that contrasts distinctly from other markings on the container.

Hazard symbols required by the *Controlled Products Regulations* must be of a colour that is not likely to conflict or create confusion with a safety mark required by Part V of the Transportation of Dangerous Goods Regulations. (See Appendix A.2 of this Chapter for the description and colours of TDG safety marks). WHMIS hazard symbols show a variety of pictograms (cylinders, flame, stylized "T", skull and crossbones, etc.) surrounded by a circular border.

FIGURE 7

ACCEPTABLE FORMAT FOR THE SUPPLIER LABEL

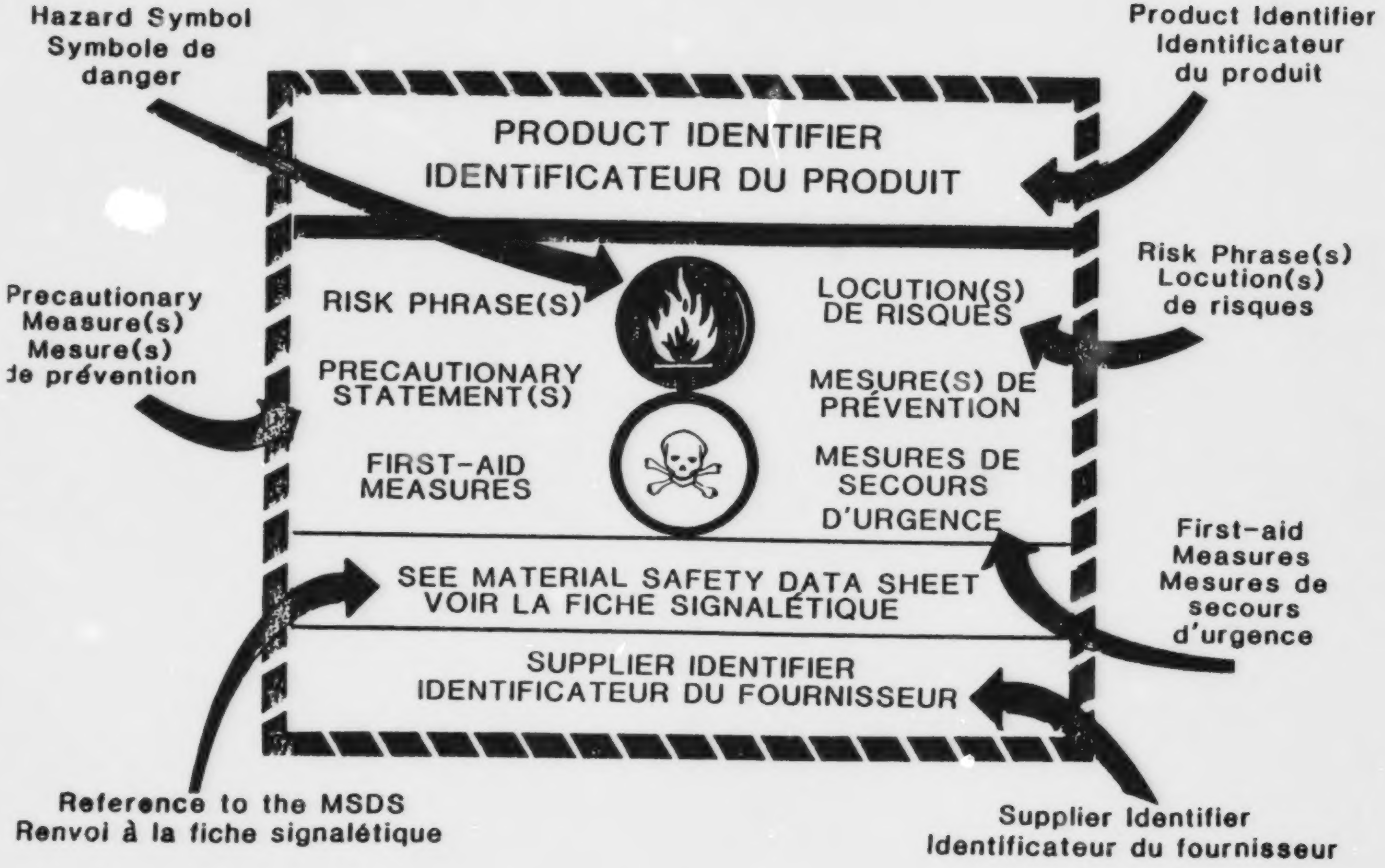

Hazard Symbol
Symbole de danger
Product Identifier
Identificateur du produit
PRODUCT IDENTIFIER
IDENTIFICATEUR DU PRODUIT
Precautionary Measure(s)
Mesure(s) de prévention
RISK PHRASE(S)
LOCUTION(S) DE RISQUES
Risk Phrase(s)
Locution(s) de risques
PRECAUTIONARY STATEMENT(S)
MESURE(S) DE PRÉVENTION
FIRST-AID MEASURES
MESURES DE SECOURS D'URGENCE
First-aid Measures
Mesures de secours d'urgence
SEE MATERIAL SAFETY DATA SHEET
VOIR LA FICHE SIGNALÉTIQUE
SUPPLIER IDENTIFIER
IDENTIFICATEUR DU FOURNISSEUR
Reference to the MSDS
Renvoi à la fiche signalétique
Supplier Identifier
Identificateur du fournisseur

Diagram provided by Labour Canada.

Four rules will prevent confusion between the two systems.

i) The colour orange must not be used for any WHMIS symbol because it is reserved for TDG Class 1, Explosives.

ii) The WHMIS symbol may be displayed in the same colour combination as required by TDG for that product.

For example, the TDG background colour for most flammables is red, and for oxidizers, yellow. It is permissible to use these colours for WHMIS Class B, Flammable and Combustible Material, and Class C, Oxidizing Materials, respectively.

Similarly, it is permissible to use the combination black on white for designation of either WHMIS Class D, Poisonous and Infectious Materials, or Class E, Corrosive Material, as this is the combination specified for similar hazard categories under TDG.

iii) Except for the colour orange, the WHMIS symbol may be displayed in any colour combination other than possible colour combinations required under TDG for that pictogram.

For example, TDG does not use colours such as brown, purple, etc. These colours can be used for WHMIS symbols.

iv) The WHMIS symbol must not be a colour combination that is possible under TDG for that pictogram but not required by TDG for that product.

For example, one TDG colour combination for the cylinder pictogram is green on white, which applies to non-flammable, non-toxic, non-corrosive compressed gases. The pictogram for WHMIS Class A, Compressed Gases, is the cylinder. The combination green and white must not be used in WHMIS for any compressed gas which is flammable, toxic or corrosive.

The application of rules (i)-(iv) does permit the use of black on white for all WHMIS hazard symbols, except that the cylinder pictogram used to depict a compressed gas which is not corrosive must not be a solid black cylinder on a white background. A black outline of a cylinder is, however, acceptable.

Figure 8 summarizes colour restrictions for each of the WHMIS hazard symbols.

FIGURE 8

COLOUR RESTRICTIONS FOR WHMIS HAZARD SYMBOLS

WHMIS Class	Pictogram in the Hazard Symbol	Restrictions*
A	Cylinder	If product is flammable, poisonous (toxic) or corrosive, a green-white colour combination cannot be used. If product is not corrosive, a solid black cylinder on white background cannot be used. However, a black outline of a cylinder with white interior and a white background is acceptable.
B	Flame	The colour yellow cannot be used in any colour combination. Unless the product, on contact with water, emits flammable gases, the colour blue cannot be used in any colour combination.
C	Flame with an "O"	The colours red or blue cannot be used in any colour combination of the two colours or with any other colour.
D	1. Skull and Crossbones	No restriction, except as noted below (*).
	2. Stylized "T"	No restriction, except as noted below (*).
	3. Biohazard	No restriction, except as noted below (*).
E	Corrosive	No restriction, except as noted below (*).
F	Stylized "R" (Dangerously Reactive)	No restriction, except as noted below (*).

---

* The colour orange must not be used for any WHMIS Class because it is reserved for TDG Class 1, Explosives.

d) Legibility - Any information required on a label must be easily legible, and contrasted distinctly from other matter on the container.

Hazard symbols should be large enough to provide a clear warning to workers. The hazard symbol is composed of a pictogram within a circular border. The recommended minimum size of symbol, consistent with the Hazardous Products (Hazardous Substances) Regulations, is one that covers an area of 4% of the area of the display panel or has a diameter of 6 mm, whichever is larger. The area of the display panel is the area of the front surface in the case of a box or, in the case of a cylindrical container, 40% of the total area, excluding the top and bottom. It is also recommended that the size of the symbol need not be more than 50 mm in diameter.

e) Durability - The label must be sufficiently durable and resistant under normal conditions of transport, storage and use to remain attached and legible during the life of the product. Print that can be dissolved by the contents of the container, and paper or plastic sleeves that are removed easily are not acceptable.

f) Application - A label is applied to a controlled product if it is:

- attached to;
- imprinted on;
- stencilled on; or
- embossed on

the controlled product or container or, in the case of a bulk shipment of a controlled product, if it is included with the bulk shipment in the prescribed manner.

The label applied to a container of a controlled product must be prominently positioned on the part of the container that is displayed under normal conditions of storage and use. The supplier has the basic responsibility to apply WHMIS supplier labels to controlled products. There are four situations in which the supplier need not apply WHMIS labels to containers of controlled products in multi-container shipments.

The supplier does not have to label:

- an inner container, if the outer container bears a WHMIS supplier label and the purchaser of the controlled product undertakes in writing to apply the WHMIS label to the inner container;
- a package liner of the controlled product;
- the outer container, if the label on an inner container is visible and legible through the outer container under normal conditions of storage and handling; and
- the outer container of a controlled product if the outer container has applied to it a label in accordance with TDG Regulations, and inner containers bear WHMIS supplier labels.

NOTE: A controlled product shipped in a single container must have a WHMIS label applied in addition to any necessary TDG markings. Where both a supplier and TDG label appear on a container, the supplier label can be attached beside or be separate from a TDG label. The TDG label must not appear within the WHMIS supplier label border.

4. Revision of Labels

Supplier labels must be revised when information becomes available that necessitates a change in any content category on the label. The supplier is not obliged to send updated labels to previous customers.

Label information must be consistent with the supplier material safety data sheet which must be kept current and, at minimum, be prepared and dated not more than three years before the date of sale or importation of the controlled product. Information on data sheets is provided in Chapter 4, The Material Safety Data Sheet.

3.3.2 THE WORKPLACE LABEL

Requirements for workplace labels and identifiers are performance oriented and permit flexibility to account for the condition of the controlled product, the intended use, immediacy of use, containment in transfer or reaction systems, and degree of employee control over the product.

1. Content, Design and Application of Workplace Labels

Three content categories required on all workplace labels are:

- the product identifier;
- information for the safe handling of the controlled product; and
- where a material safety data sheet for the controlled product is available, a statement to that effect.

Guidelines and requirements for the content, design and location of supplier labels may be used in the development of workplace labels. This includes the use of WHMIS hazard symbols and the distinctive supplier label border which may be used but are not required for workplace labels.

The product identifier on the workplace label must be identical to that found on the material safety data sheet of the corresponding controlled product, and should give one of: the brand name, code name or code number as specified by the supplier if the product is purchased from the supplier; or the chemical name, common name, generic name or trade name of the controlled product.

Information for safe handling means precautions that the worker must observe to minimize the risks of adverse health effect or injury. Alternatively, hazard information about the product can be given as long as through the worker education program the worker understands the precautions to be taken to guard against the specific hazards.

If a material safety data sheet is available for the controlled product, the workplace label must include a statement to that effect. For some products, such as consumer products or pesticides, a data sheet may not be available in which case the statement regarding the data sheet is not required on the workplace label.

The label must be easily legible and prominently positioned on the part of the container that is displayed under normal conditions of storage and use in order to provide clear warning to employees who work with the product or in its vicinity.

If the employer wishes to provide hazard symbols on workplace labels, but different from those required on WHMIS supplier labels, then the workplace symbols must not result in worker misunderstanding of the hazards represented by the product.

For example, the colour and number symbols of the National Fire Protection Association (NFPA) applies to "hazards created by short term exposure . . . (in) fire or related emergency conditions". NFPA symbols are not meant to apply to hazards associated with the long-term exposures that are often encountered in the workplace. Moreover, NFPA provides three basic hazard categories; health effects, flammability and reactivity, compared to six hazard classes for WHMIS. The relationship between NFPA and WHMIS is sometimes unclear, particularly for categories such as WHMIS Class D, Division 2 which covers chronic toxic effects, a health consequence foreign to the NFPA system.

If NFPA symbols were to be used on workplace labels, workers must be instructed in differences between the NFPA and WHMIS systems. Worker understanding of hazards represented by a controlled product must not be less than that communicated by WHMIS supplier labels and data sheets.

2. Revision of Workplace Labels

Workplace labels must be revised when information becomes available that necessitates a change in any content category on the label.

Label information must be kept consistent with employer material safety data sheets which must be updated:

- as soon as practical but not later than 90 days after new hazard information becomes available to the employer; and
- at least every three years.

Detailed information on material safety data sheets is provided in Chapter 4, The Material Safety Data Sheet.

3.3.3 OTHER MEANS OF IDENTIFICATION

In some circumstances, the employer is permitted to use a means of identification other than a label to ensure workers recognize the presence of a controlled product. Examples of other means are warning signs, placards and codes (colour, number or letter).

Types of circumstances in which means of identification other than labels may be used and a description of the appropriate identification are summarized in Figure 9 on page 3-39.

Depending on the situation, various means of identification are appropriate. For example, in Circumstance #1, the placard identifier must contain the information required on a workplace label. On the other hand, in Circumstance #5 (transfer and reaction systems), any means of identification combined with worker education is appropriate as long as the necessary hazard information is understood by the worker. For example, devices such as warning signs, symbols, colour coding, process flow charts, or piping diagrams would all be acceptable if, when combined with worker education, workers are able to identify the contents in the system.

Of course, in all circumstances, workplace labels, if appropriately displayed and of legible size, may be substituted for identifiers.

FIGURE 9

MEANS OF IDENTIFICATION OTHER THAN LABELS PERMITTED IN WHMIS

	Type of Circumstance	Description of Means of Identification
1.	Product (i) is not in a container of any kind, or (ii) is in a container or form intended for export, or (iii) is in a container intended for sale to be labelled at a later time (i.e. typically more than one work shift later), but without undue delay.	Post a placard which (i) discloses the information required for a workplace label and (ii) is of a size and in a location such that information on it is conspicuous and clearly legible to workers.
2.	Hazardous wastes produced in the workplace. * Refer to MR53/88.	Any means (e.g. labels, placards, colour coding of waste containers in combination with worker education, or warning signs with a picture that conveys the appropriate message or that reads "Caution -- Hazardous Waste") to ensure worker recognition of the waste and his or her safety.
3.	Product transferred to a new container which is (i) to be used only in a laboratory or (ii) which is portable, filled directly from a labelled container and is under the control of the employee who filled it and is used only by that employee during the shift in which it was filled.	Clearly identify container as to contents (for example, with the name of the product written on the container). NOTE: Products required for immediate use; i.e. use at once, without delay do not require identification.
4.	Mixtures, and substances undergoing analyses, tests or evaluations in a laboratory (including products produced in a laboratory for research and development work in the same lab).	Clearly identify (for example, with names or number codes or letters on containers, or adjacent to containers).
5.	Product contained in a transfer or reaction system such as a pipe or piping system, a process or reaction vessel, tank car or tank truck, conveyor belt or similar conveyance.	Any combination of worker education and means of identification (e.g. colour coding, labels, placards, piping diagrams). Note CSA Standard B53.-1958 Code for Identification of Piping Systems and ANSI Standard A13.1-1981 Scheme for the Identification of Piping Systems.

APPENDIX A

FEDERAL LABELLING REQUIREMENTS IN CANADA - OTHER THAN WHMIS

A.1 THE HAZARDOUS PRODUCTS ACT (RESTRICTED PRODUCTS)

Pursuant Regulations:

Hazardous Products (Hazardous Substances) Regulations. **(NOTE: Regulations are undergoing revision and will likely be retitled as *Consumer Chemicals and Containers Regulations.*)**

Application:

Restricted products sold as consumer products.

Responsibility for Labelling:

Manufacturer or importer.

Definition of Restricted Product:

Any product, material or substance that is or contains a poisonous, toxic, flammable, explosive, corrosive, infectious, oxidizing or reactive product, material or substance that is or is likely to be a danger to the health or safety of the public . . . and is included in Part II of Schedule I of the Hazardous Products Act.

Information Required on Label:

- The nature of hazard symbol, superimposed on the appropriate degree of hazard symbol (see Figure 10).
- The signal word "Danger", "Warning" or "Caution".
- A statement of the nature of the primary hazard and of the secondary hazard (if appropriate).
- Precautions to be followed.
- First aid treatment.
- Source of the hazard.
- The first aid treatment antidotes.
- Directions for the proper and safe use and storage.

Format:

- Mixture of symbols and ANSI language system.
- Bilingual.

Discussion:

The Hazardous Products Act legislates requirements for three types of hazardous products: prohibited, restricted and controlled. Prohibited products may not be imported, advertised or sold and are listed in Part I of Schedule I of the Act. Restricted products are intended primarily for consumer rather than workplace use and include products listed in Part II of Schedule I of the Act; for example:

- bleaches, cleansers and sanitizers for household use containing chlorine and chlorine compounds;
- cleansers for household use containing sodium hydroxide, potassium hydroxide, sodium bisulfate, hydrochloric acid or phosphoric acid;
- household polishes and cleaning agents containing petroleum distillates or chlorinated aliphatic hydrocarbons; and
- glues for household or hobby use containing aliphatic or aromatic hydrocarbon solvents, or ketone solvents.

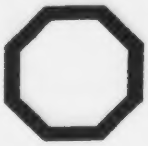
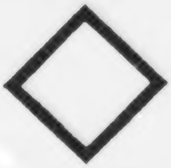
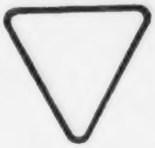
Differences between labels required on restricted and controlled products include:

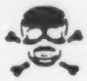
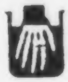
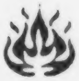
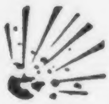
- restricted product symbols are based on four types of hazard; WHMIS supplier symbols, on eight;
- WHMIS symbols do not specify degree of hazard; and
- restricted product labels do not require reference to material safety data sheets.

FIGURE 10

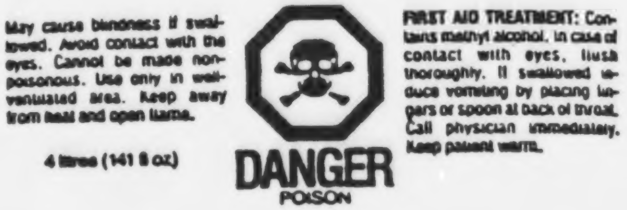
RESTRICTED PRODUCT LABELS

Signal Words, Shapes and Pictograms

SIGNAL WORD Degree of Hazard	SYMBOL — SYMBOLE	MOT-INDICATEUR Degré du risque
1. Danger		1. Danger
2. Warning		2. Avertissement
3. Caution		3. Attention

SIGNAL WORD Nature of Primary Hazard	SYMBOL — SYMBOLE	MOT-INDICATEUR Nature du risque primaire
1. Poison		1. Poison
2. Corrosive		2. Corrosif
3. Flammable		3. Inflammable
4. Explosive		4. Explosif

Sample Label



May cause blindness if swallowed. Avoid contact with the eyes. Cannot be made non-poisonous. Use only in well-ventilated area. Keep away from heat and open flame.

4 litres (140.8 oz)

DANGER
POISON

FIRST AID TREATMENT: Contains methyl alcohol. In case of contact with eyes, flush thoroughly. If swallowed induce vomiting by placing fingers or spoon at back of throat. Call physician immediately. Keep patient warm.

(NOTE: Full label must also show French version.)

A.2 TRANSPORTATION OF DANGEROUS GOODS ACT

Pursuant Regulations:

Transportation of Dangerous Goods (TDG) Regulations (federal) and associated provincial/territorial legislation.

Application:

Handling, offering for transport and transportation of dangerous goods in Canada.

Responsibility for Labelling:

Shared responsibility -- the person(s) (1) offering goods for transport, and (2) handling the goods during transport.

Definition of Dangerous Goods:

Any product, substance(s) or organism listed in Schedule II of the TDG Regulations or that are otherwise classified as dangerous through the application of criteria described in Part III of those regulations. Goods are assigned to one or more of nine Classes shown in Figure 11.

Information Required on Label:

- Technical terms for some Classes and Divisions; e.g. Explosive, Infectious, Radioactive, and Poison Gas (for transborder shipments).
- Class and, in some cases, Division numbers.
- Hazard symbols.

(Product identification numbers are required with placards or panels on large containers pursuant to TDG Regulations 5.16-5.36.)

Format:

- UN format.
- Two or more labels in the event of primary and subsidiary classifications.
- Standard labels for Classes and Divisions are diamond shaped (square on point), with distinctive colours. Hazard symbols appear in the top half and Class numbers at the base.
- Labels for special hazards are rectangular.

Discussion:

The system is designed for product identification and emergency procedures. Legislation establishes nine Classes of dangerous goods and prescribes requirements related to shipping labels, placards and manifests, training programs and reporting of dangerous occurrences.

Section 4 of the Act requires that "all containers, packaging and means of transport . . . display all applicable prescribed safety marks". Appropriate markings are determined by the Classes to which products belong, and Divisions within those Classes.

Part V of the regulations provide requirements for safety markings. Where goods are transported in packages, or in containers of 454 litres or less, the consignor must display a label corresponding to the primary classification of the goods in conformity with Sections 5.7, 5.15 and Schedule V, Parts I and IV, of the regulations.

Special labels are required where packages or containers:

- contain magnetized materials to be transported on passenger aircraft;
- contain polychlorinated biphenyls;
- contain goods which are prohibited from transportation on passenger aircraft; or
- have been emptied of dangerous goods but have not been cleaned or purged of residues so that a hazard still exists.

Differences between the label systems of TDG and WHMIS include:

- TDG applies to nine Classes; WHMIS, six;
- TDG is largely a coded label system; WHMIS, descriptive; and
- TDG does not require reference to material safety data sheets.

Hazard symbols in WHMIS are similar but not identical to those used under TDG requirements. All WHMIS hazard symbols feature pictograms within circular borders. TDG uses pictograms without borders but requires their placement on diamond-shaped labels with distinctive colours for the purpose of designating Classes and Divisions. Figure 12 provides a comparison of the pictograms used to designate Classes and Divisions in each of the two systems. Figure 13 shows label formats and colours required on TDG labels.

See Chapter 2 of this Manual for a comparison of the classification systems of WHMIS and TDG.

FIGURE 11

CLASSES AND DIVISIONS OF DANGEROUS GOODS

Class 1: Explosives

1.1 Substances or articles with a mass explosion hazard.

1.2 Substances or articles with a fragment projection hazard, but not a mass explosion hazard.

1.3 Substances or articles which have a fire hazard along with either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

1.4 Substances or articles which present no significant hazard -- explosion effects are largely confined to the package and no projection or fragments of appreciable size or range are to be expected.

1.5 Insensitive substances which nevertheless have a mass explosion hazard like those substances in 1.1.

Class 2: Gases

2.1 Flammable gases.

2.2 Non-flammable, non-toxic, non-corrosive gases.

2.3 Poisonous gases.

2.4 Corrosive gases.

Class 3: Flammable Liquids

3.1 Liquids with a closed-cup flashpoint of less than -18°C.

3.2 Liquids with a closed-cup flashpoint not less than -18°C but less than 23°C.

3.3 Liquids with a closed-cup flashpoint not less than 23°C but less than 37.8°C (except for international air and marine transport, where the upper limits are 60.5°C and 61°C respectively).

Class 4: Flammable Solids, Substances Liable to Spontaneous Combustion, and Substances that on Contact with Water Emit Flammable Gases

4.1 Solids which under normal conditions of transport are readily ignitable and burn vigorously and persistently or which cause or contribute to fire through friction or from heat retained from manufacturing or processing.

4.2 Substances liable to spontaneous combustion under normal conditions of transport, or to spontaneous heating and ignition when in contact with air.

4.3 Substances that emit dangerous quantities of flammable gases or become spontaneously combustible on contact with water or water vapour.

FIGURE 11 CONTINUED

CLASSES AND DIVISIONS OF DANGEROUS GOODS

Class 5: Oxidizing Substances and Organic Peroxides

5.1 Oxidizers - Substances which cause or contribute to the combustion of other material by yielding oxygen or other oxidizing substances.

5.2 Organic Peroxides - Compounds that contain the bivalent "-O-O-" structure which is a strong oxidizing agent and may be liable to explosive decomposition or is sensitive to heat, shock or friction.

Class 6: Poisonous Substances and Infectious Substances

6.1 Solids or liquids that are poisonous through inhalation of vapours, by skin contact or by ingestion.

6.2 Organisms that are infectious or that are reasonably believed to be infectious to humans or to animals, and the toxins of such organisms.

Class 7: Radioactive Materials

Radioactive materials within the meaning of the Atomic Energy Control Act with activity greater than 74 kBq/kg.

Class 8: Corrosive Substances

Substances that cause visible necrosis of skin or which corrode steel or non-clad aluminum.

Class 9: Miscellaneous Dangerous Goods

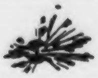
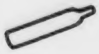
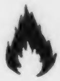
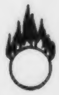
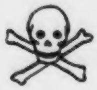
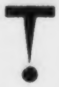
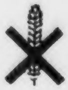
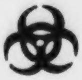
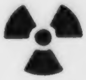
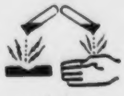
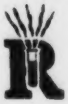
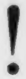
9.1 Substances or products presenting dangers sufficient to warrant regulation in transport but which cannot be ascribed to any other Class.

9.2 Environmentally hazardous substances.

9.3 Dangerous wastes.

FIGURE 12

COMPARISON OF THE USE OF PICTOGRAMS IN HAZARD SYMBOLS USED ON WHMIS AND TDG LABELS

Pictogram	Use in WHMIS	Use in TDG
	NOT APPLICABLE	CLASS 1: EXPLOSIVES Divisions 1-3
	CLASS A: COMPRESSED GASES	CLASS 2: COMPRESSED GASES Division 2: Non-flammable, Non-toxic, Non-corrosive Gases Division 4: Corrosive Gases
 *	CLASS B: FLAMMABLE AND COMBUSTIBLE MATERIALS Divisions 1-6	CLASS 2, Division 1: Flammable Gases CLASS 3: FLAMMABLE LIQUIDS CLASS 4: FLAMMABLE SOLIDS, ETC.
 *	CLASS C: OXIDIZING MATERIAL	CLASS 5: OXIDIZERS AND ORGANIC PEROXIDES
	CLASS D, Division 1: Materials Causing Immediate and Serious Toxic Effect**	CLASS 2, Division 3: Poison Gas CLASS 6, Division 1, Packing Groups I and II of Poisonous Substances
	CLASS D, Division 2: Materials Causing Other Toxic Effects**	NOT APPLICABLE
	NOT APPLICABLE	CLASS 6, Division 1, Packing Group III of Poisonous Substances
	CLASS D, Division 3: Biohazardous Infectious Material	CLASS 6, Division 2: Infectious Substances
	NOT APPLICABLE	CLASS 7: RADIOACTIVE MATERIALS
	CLASS E: CORROSIVE MATERIAL	CLASS 8: CORROSIVES
	CLASS F: DANGEROUSLY REACTIVE MATERIAL	NOT APPLICABLE
	NOT APPLICABLE	CLASS 9: MISCELLANEOUS PRODUCTS OR SUBSTANCES

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* The full TDG symbol also includes a horizontal bar below the pictogram shown

** Where a product meets criteria for inclusion in both Divisions 1 and 2 of Class D, the label may display only the skull and crossbones symbol.

FIGURE 13

LABEL FORMATS AND COLOURS REQUIRED UNDER THE TRANSPORTATION OF DANGEROUS GOODS REGULATIONS

SCHEDULE V — ANNEXE V

PART I — PARTIE I

Labels/Étiquettes

Domestic Consignment / Envoi intérieur	U S / Canada / États-Unis / Canada

Figure 1 **Division 1, 2 or 3**
Division 1, 2 ou 3

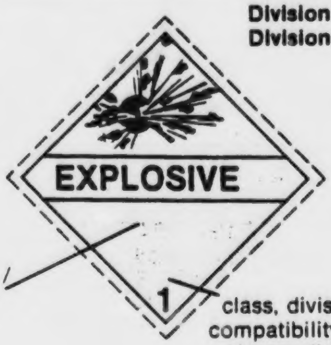

EXPLOSIVE
1
orange / orange
class, division and compatibility group / classe, division et groupe de compatibilité

Figure 1a **Division 1, 2 or 3**
Division 1, 2 ou 3

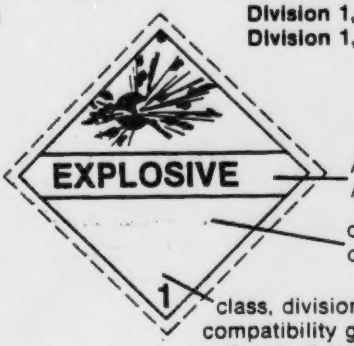

EXPLOSIVE
1
A or B / A ou B
orange / orange
class, division and compatibility group / classe, division et groupe de compatibilité

Figure 2 **Division 4**

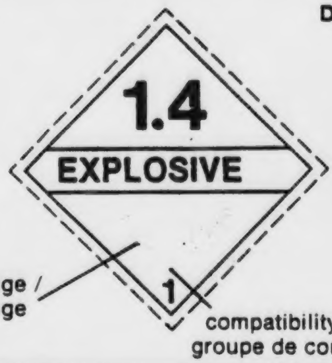

1.4
EXPLOSIVE
1
orange / orange
compatibility group / groupe de compatibilité

Figure 2a **Division 4**

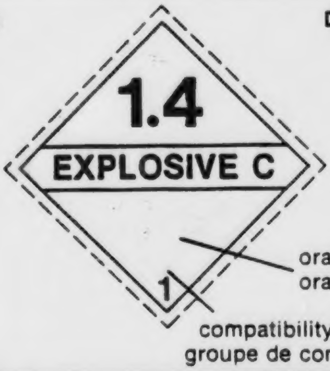

1.4
EXPLOSIVE C
1
orange / orange
compatibility group / groupe de compatibilité

Figure 3 **Division 5**

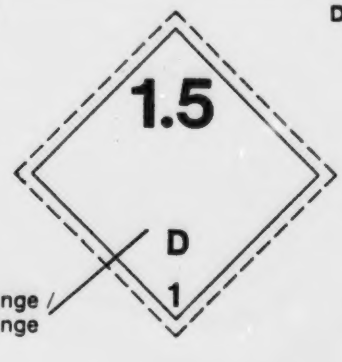

1.5
D
1
orange / orange

Figure 3a **Division 5**

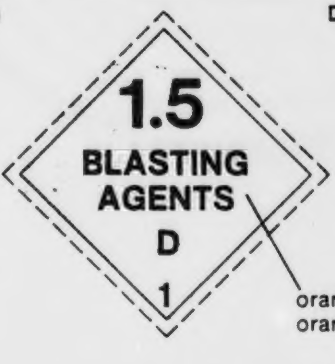
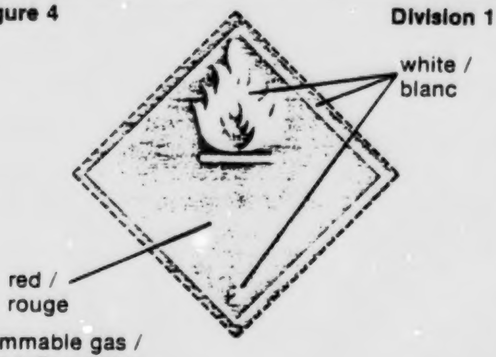

1.5
BLASTING AGENTS
D
1
orange / orange

FIGURE 13 (cont'd)

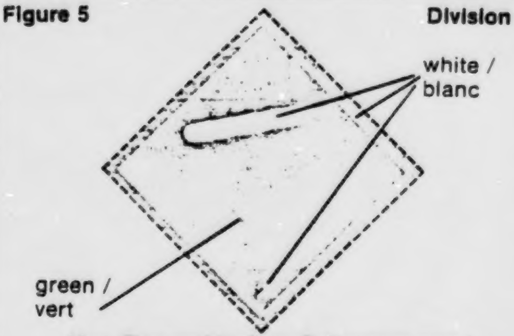
Class 2 — Gases / Classe 2 — Gaz

Figure 4 **Division 1**


white / blanc
red / rouge

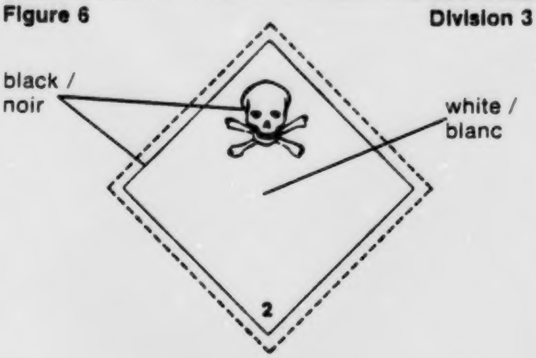
Flammable gas / Gaz inflammable

Figure 5 **Division 2**


white / blanc
green / vert

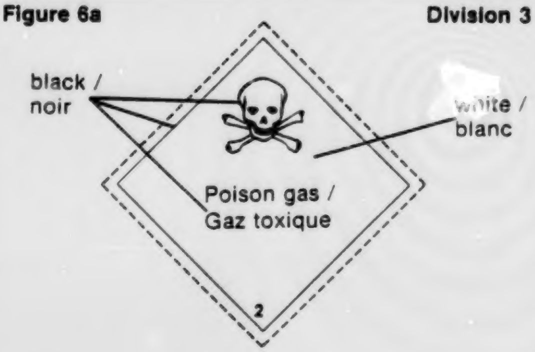
Non-Flammable, Non-Poisonous gas / Gaz ininflammable, non-toxique

Figure 6 **Division 3**


black / noir
white / blanc
2

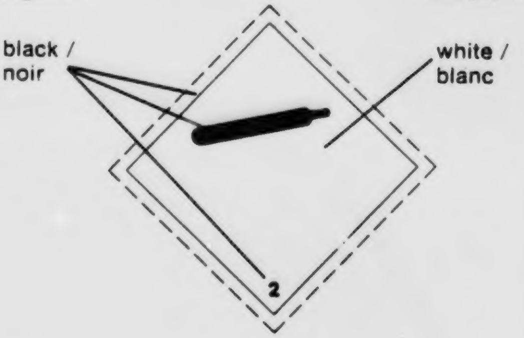
Poison gas / Gaz toxique

Figure 6a **Division 3**


black / noir
white / blanc
Poison gas / Gaz toxique
2

Poison gas / Gaz toxique

Figure 7 **Division 4**

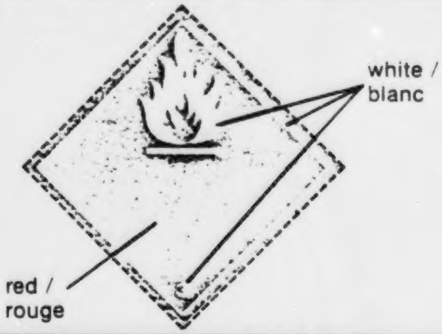

black / noir
white / blanc
2

Corrosive gas / Gaz corrosif

FIGURE 13 (cont'd)

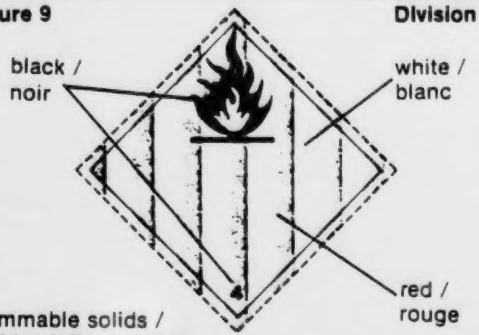
Class 3 — Flammable liquids / Classe 3 — Liquides inflammables

Figure 8


white /
blanc
red /
rouge

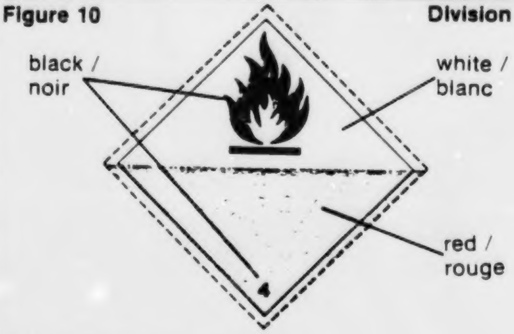
Class 4 — Flammable solids, substances liable to spontaneous combustion, substances that on contact with water emit flammable gases /
Classe 4 — Solides inflammables, matières sujettes à l'inflammation spontanée, matières qui, au contact de l'eau, dégagent des gaz inflammables

Figure 9 **Division 1**


black /
noir
white /
blanc
red /
rouge
4

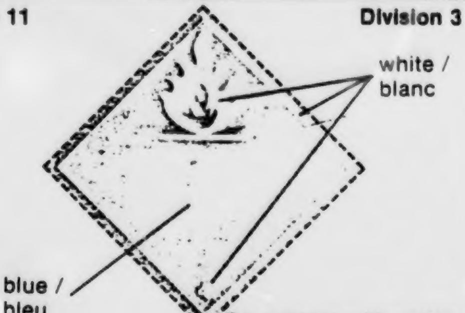
Flammable solids /
Solides inflammables

Figure 10 **Division 2**


black /
noir
white /
blanc
red /
rouge
4

Spontaneously combustible /
Inflammation spontanée

Figure 11 **Division 3**

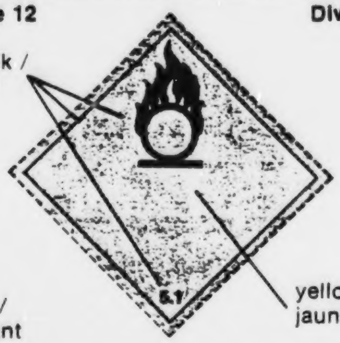

white /
blanc
blue /
bleu

On contact with water,
emits flammable gases /
Au contact de l'eau,
dégage des
gaz inflammables

FIGURE 13 (cont'd)

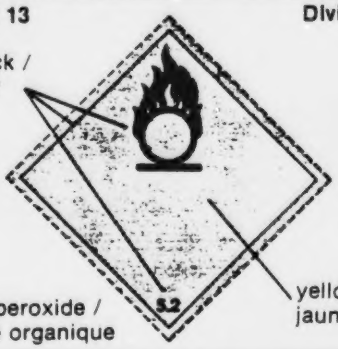
Class 5 — Oxidizing substances and organic peroxides /
Classe 5 — Matières comburantes et peroxydes organiques

Figure 12 **Division 1**


black /
noir
5.1
yellow /
jaune

Oxidizer /
Comburant

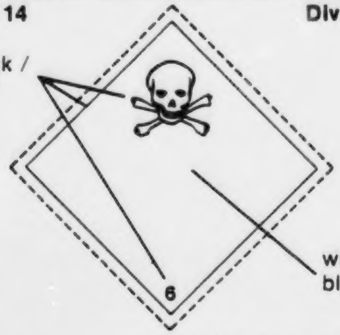
Figure 13 **Division 2**


black /
noir
5.2
yellow /
jaune

Organic peroxide /
Peroxyde organique

Class 6 — Poisonous (toxic) and infectious substances /
Classe 6 — Matières toxiques et matières infectieuses

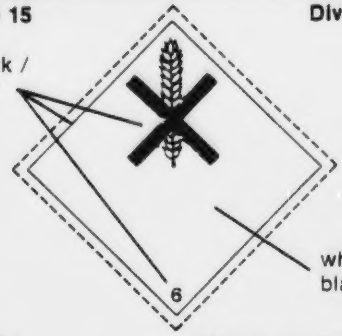
Figure 14 **Division 1**


black /
noir
6
white /
blanc

Poison /
Toxique

Packing groups I and II /
Groupes d'emballage I et II

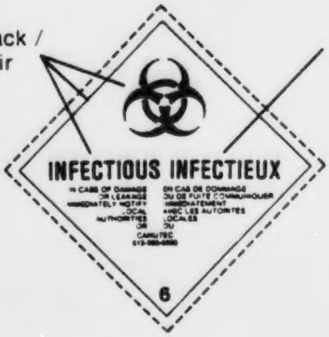
Figure 15 **Division 1**


black /
noir
6
white /
blanc

Harmful /
Nocif

Packing group III /
Groupe d'emballage III

Figure 16 **Division 2**

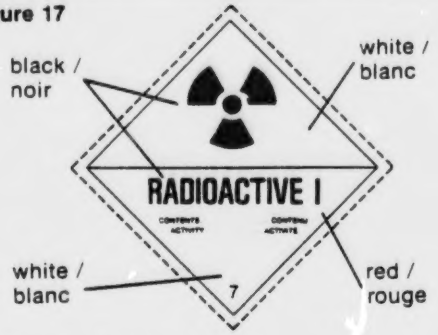

black /
noir
white /
blanc
INFECTIOUS INFECTIEUX
6

Infectious substances /
Matières infectieuses

FIGURE 13 (cont'd)

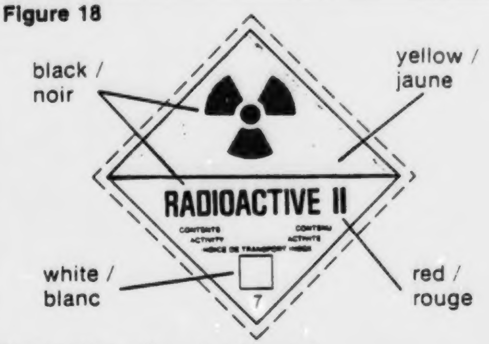
Class 7 — Radioactive materials / Classe 7 — Matières radioactives

Figure 17


black / noir
white / blanc
RADIOACTIVE I
white / blanc
7
red / rouge

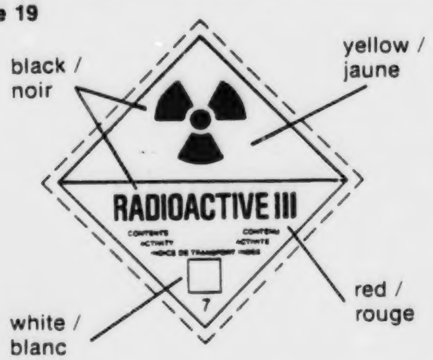
Radioactive white I / Blanc I

Figure 18


black / noir
yellow / jaune
RADIOACTIVE II
white / blanc
7
red / rouge

Radioactive yellow II / Jaune II

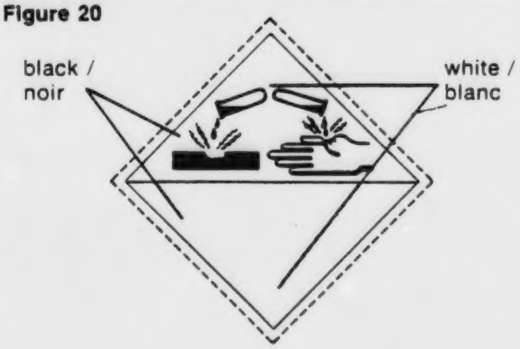
Figure 19


black / noir
yellow / jaune
RADIOACTIVE III
white / blanc
7
red / rouge

Radioactive yellow III / Jaune III

Class 8 — Corrosive / Classe 8 — Matières corrosives

Figure 20


black / noir
white / blanc

Class 9 — Miscellaneous products or substances / Classe 9 — Matières ou produits divers

Figure 21

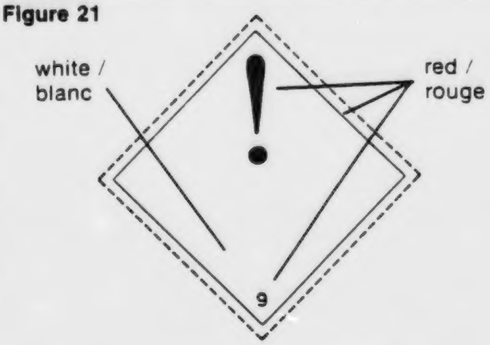

white / blanc
red / rouge
9

FIGURE 13 (cont'd)

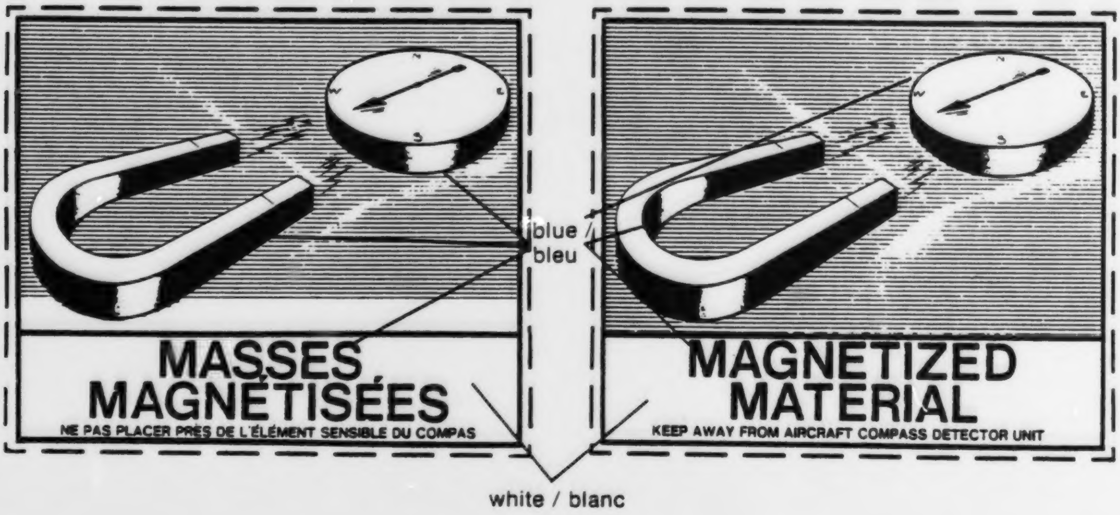
SCHEDULE V — ANNEXE V

PART IV — PARTIE IV

Special labels or placards/ Étiquettes ou plaques spéciales

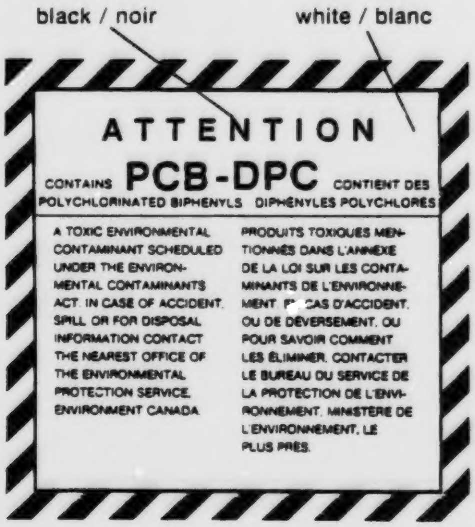
Magnetized material / Matières magnétisées

Figure 1


blue /
bleu
MASSES MAGNÉTISÉES
NE PAS PLACER PRÈS DE L'ÉLÉMENT SENSIBLE DU COMPAS
MAGNETIZED MATERIAL
KEEP AWAY FROM AIRCRAFT COMPASS DETECTOR UNIT
white / blanc

Polychlorinated biphenyls / Diphényles polychlorés	Package orientation / Sens du colis

Figure 2


black / noir
white / blanc

ATTENTION

CONTAINS **PCB-DPC** CONTIENT DES

POLYCHLORINATED BIPHENYLS DIPHÉNYLES POLYCHLORÉS

A TOXIC ENVIRONMENTAL CONTAMINANT SCHEDULED UNDER THE ENVIRONMENTAL CONTAMINANTS ACT. IN CASE OF ACCIDENT, SPILL OR FOR DISPOSAL INFORMATION CONTACT THE NEAREST OFFICE OF THE ENVIRONMENTAL PROTECTION SERVICE, ENVIRONMENT CANADA.

PRODUITS TOXIQUES MENTIONNÉS DANS L'ANNEXE DE LA LOI SUR LES CONTAMINANTS DE L'ENVIRONNEMENT. EN CAS D'ACCIDENT, OU DE DÉVERSEMENT, OU POUR SAVOIR COMMENT LES ÉLIMINER, CONTACTER LE BUREAU DU SERVICE DE LA PROTECTION DE L'ENVIRONNEMENT, MINISTÈRE DE L'ENVIRONNEMENT, LE PLUS PRÈS.

Figure 3

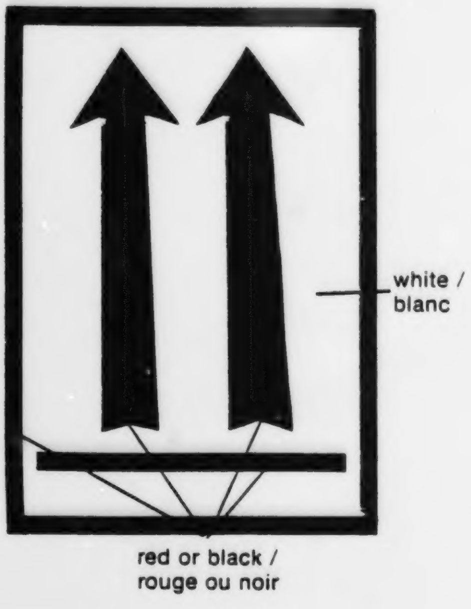
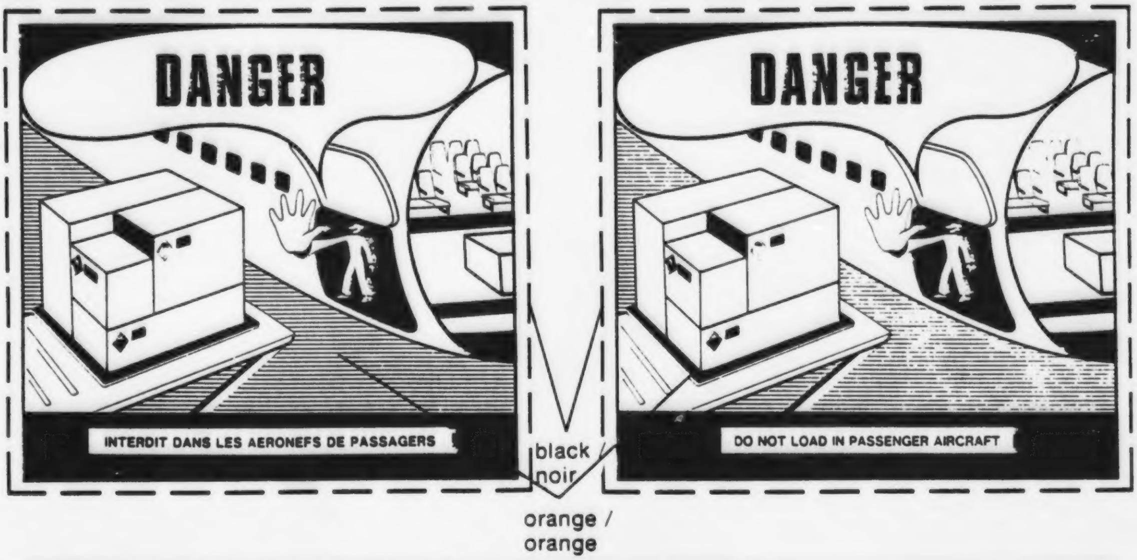

white /
blanc
red or black /
rouge ou noir

FIGURE 13 (cont'd)

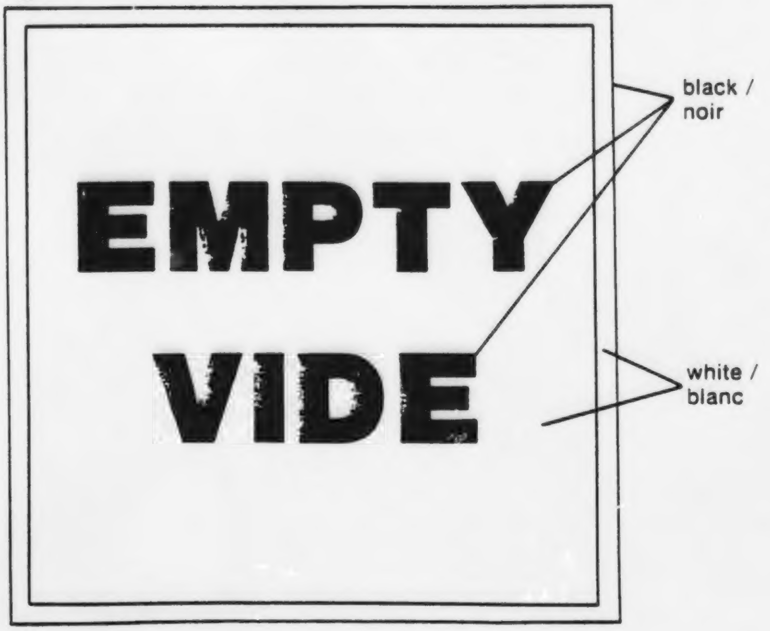
Cargo aircraft only / Aéronef cargo seulement

Figure 4


DANGER
INTERDIT DANS LES AERONEFS DE PASSAGERS
DANGER
DO NOT LOAD IN PASSENGER AIRCRAFT
black / noir
orange / orange

Empty sign / Écriteau « vide »

Figure 5


EMPTY
VIDE
black / noir
white / blanc

A.3 PEST CONTROL PRODUCTS ACT

Pursuant Regulations:

Pest Control Products Regulations.

Application:

Pest control products imported into or sold in Canada.

Responsibility for Labelling:

Manufacturers and distributors of pest control products.

Definition of a Pest Control Product:

Any product used for the control of any injurious, noxious or troublesome insect, fungus, bacterial organism, virus, weed or rodent.

Information Required on Label:

- Product name and common name of active ingredient.
- Product class (restricted, commercial, domestic).
- Concentrations of the active ingredient(s).
- Product registration number.
- Identify significant hazards with instructions on methods of alleviating the hazards.
- First aid instructions.
- Toxicological information.
- Degree of hazard symbols (similar to traffic symbols).
- Symbols identifying hazards.
- Signal words to indicate degree of hazard (danger, warning and caution) and nature of hazard (poison, corrosive, flammable and explosive).

Format:

Mixed language and UN-type symbols and traffic symbols.

Discussion:

Section 4(1) of the Act prohibits the importation or sale of any product used for the control of pests unless it is packaged and labelled as prescribed. Sections 26-40 of the regulations specify label content and format.

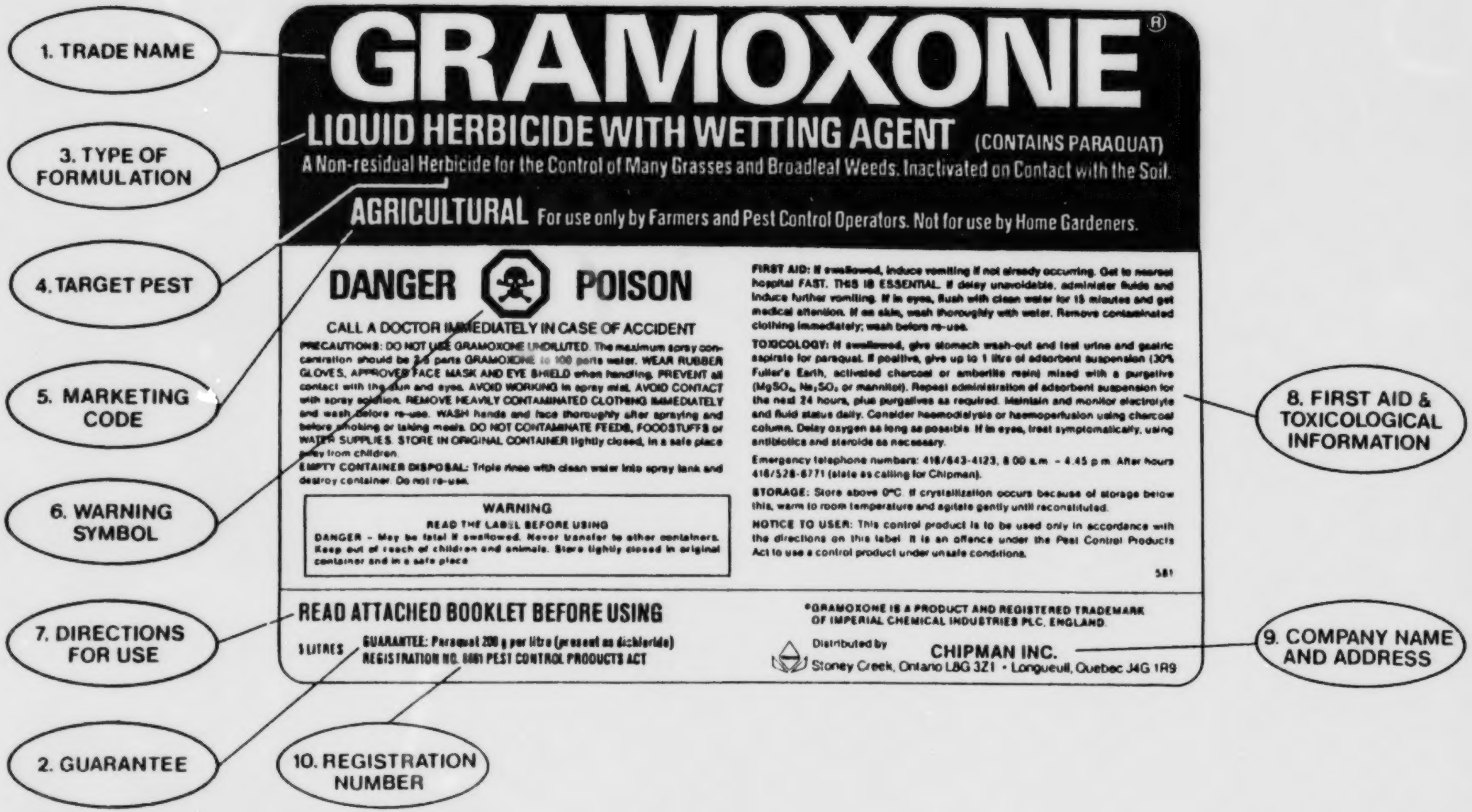
Differences between labels required under WHMIS and the Pest Control Products Act are:

- PCP label symbols are based on the four types of hazards used for restricted products, rather than the eight found in WHMIS;
- PCP toxicological information is restricted almost entirely to acute health effects;
- much of the PCP label is concerned with the effective use of the product rather than the health and safety of workers; and
- the PCP label does not require reference to a material safety data sheet and disclosure of hazardous ingredients other than "actives".

A sample label is shown in Figure 14.

FIGURE 14

SAMPLE LABEL PURSUANT TO PEST CONTROL PRODUCTS ACT


1. TRADE NAME
3. TYPE OF FORMULATION
4. TARGET PEST
5. MARKETING CODE
6. WARNING SYMBOL
7. DIRECTIONS FOR USE
2. GUARANTEE
10. REGISTRATION NUMBER
8. FIRST AID & TOXICOLOGICAL INFORMATION
9. COMPANY NAME AND ADDRESS

GRAMOXONE®

LIQUID HERBICIDE WITH WETTING AGENT (CONTAINS PARAQUAT)

A Non-residual Herbicide for the Control of Many Grasses and Broadleaf Weeds. Inactivated on Contact with the Soil.

AGRICULTURAL For use only by Farmers and Pest Control Operators. Not for use by Home Gardeners.

DANGER **POISON**

CALL A DOCTOR IMMEDIATELY IN CASE OF ACCIDENT

PRECAUTIONS: DO NOT USE GRAMOXONE UNDILUTED. The maximum spray concentration should be 2.5 parts GRAMOXONE to 100 parts water. WEAR RUBBER GLOVES, APPROVED FACE MASK AND EYE SHIELD when handling. PREVENT all contact with the skin and eyes. AVOID WORKING in spray mist. AVOID CONTACT with spray solution. REMOVE HEAVILY CONTAMINATED CLOTHING IMMEDIATELY and wash before re-use. WASH hands and face thoroughly after spraying and before smoking or taking meals. DO NOT CONTAMINATE FEEDS, FOODSTUFFS or WATER SUPPLIES. STORE IN ORIGINAL CONTAINER tightly closed, in a safe place away from children.

EMPTY CONTAINER DISPOSAL: Triple rinse with clean water into spray tank and destroy container. Do not re-use.

WARNING

READ THE LABEL BEFORE USING

DANGER - May be fatal if swallowed. Never transfer to other containers. Keep out of reach of children and animals. Store tightly closed in original container and in a safe place

FIRST AID: If swallowed, induce vomiting if not already occurring. Get to nearest hospital FAST. THIS IS ESSENTIAL. If delay unavoidable, administer fluids and induce further vomiting. If in eyes, flush with clean water for 15 minutes and get medical attention. If on skin, wash thoroughly with water. Remove contaminated clothing immediately; wash before re-use.

TOXICOLOGY: If swallowed, give stomach wash-out and test urine and gastric aspirate for paraquat. If positive, give up to 1 litre of adsorbent suspension (30% Fuller's Earth, activated charcoal or amberlite resin) mixed with a purgative ($MgSO_4$, Na_2SO_4 or mannitol). Repeat administration of adsorbent suspension for the next 24 hours, plus purgatives as required. Maintain and monitor electrolyte and fluid status daily. Consider haemodialysis or haemoperfusion using charcoal column. Delay oxygen as long as possible. If in eyes, treat symptomatically, using antibiotics and steroids as necessary.

Emergency telephone numbers: 416/643-4123, 8.00 a.m. - 4.45 p.m. After hours 416/528-6771 (state as calling for Chipman).

STORAGE: Store above 0°C. If crystallization occurs because of storage below this, warm to room temperature and agitate gently until reconstituted.

NOTICE TO USER: This control product is to be used only in accordance with the directions on this label. It is an offence under the Pest Control Products Act to use a control product under unsafe conditions.

581

READ ATTACHED BOOKLET BEFORE USING

5 LITRES

GUARANTEE: Paraquat 200 g per litre (present as dichloride)
REGISTRATION NO. 8661 PEST CONTROL PRODUCTS ACT

®GRAMOXONE IS A PRODUCT AND REGISTERED TRADEMARK OF IMPERIAL CHEMICAL INDUSTRIES PLC, ENGLAND.

Distributed by
CHIPMAN INC.
Stoney Creek, Ontario L8G 3Z1 • Longueuil, Quebec J4G 1R9

A.4 ATOMIC ENERGY CONTROL ACT

Pursuant Regulations:

Atomic Energy Control Regulations.
Transport Packaging of Radioactive Materials Regulations.

Application:

The transport and use of prescribed radioactive materials.

Responsibility for Labelling:

- Within a facility or worksite: any person who uses a container to store or otherwise hold radioactive prescribed substances.
- Transportation: the person who causes radioactive material to be transported.

Definition of Radioactive Prescribed Substance:

Uranium, thorium, plutonium, neptunium, deuterium, their respective derivatives and compounds and any other substances that the AEC Board may by regulation designate as capable of releasing atomic energy, or as being requisite for the production, use or application of atomic energy.

Information Required on Label:

1. At a Nuclear Facility or Other Worksite

Under Section 22 and 23 of the AEC Regulations, labels must be applied to containers when radioactive contents exceed the amounts defined in Schedule I to the regulations.

Labels must specify:

- the words "RADIATION - DANGER - RAYONNEMENT";
- the radiation symbol shown in Figure 15 which is set out in Schedule III of the AEC Regulations; and
- information with respect to the nature, form, quantity and date of measurement of the radioactivity of the substance in the container.

Such a label is not required if the container:

- forms part of the machinery attached to the manufacturing or processing equipment of a nuclear facility;
- contains a quantity of radioactive substance less than that shown in Schedule I of the AEC Regulations;

- is used temporarily to store radioactive isotopes under the supervision and in the presence of an atomic radiation worker; or
- is used exclusively for shipping substances containing radioactive isotopes and labelled in accordance with the requirements of the Transport Packaging of Radioactive Materials Regulations.

2. For Shipment of Radioactive Materials

Under Section 20 of the Transport Packaging of Radioactive Materials Regulations, any package, packaging or transport container containing radioactive material shall bear safety marks in accordance with the categories and requirements of Schedule VI to the regulations.

Labels must be of a format consistent with the activity category of the material, and provide:

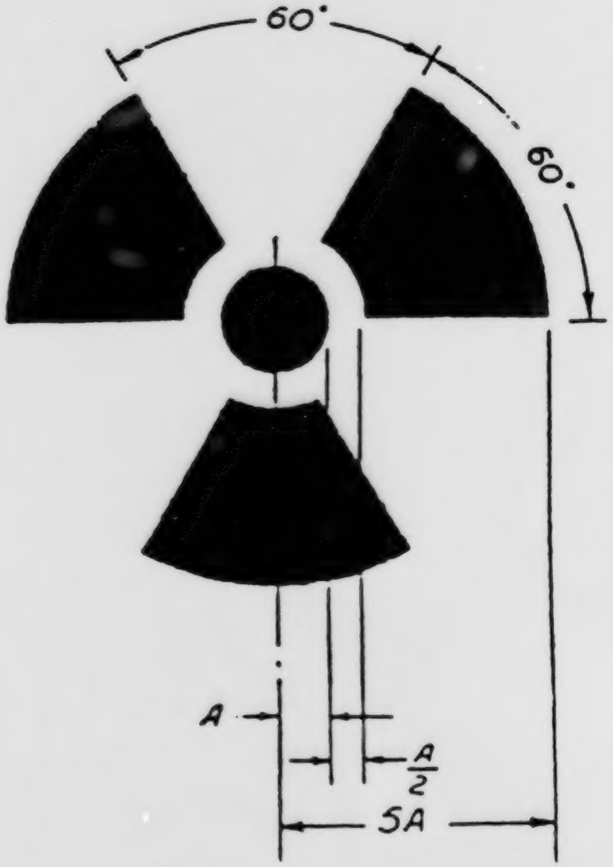
- the name and mass number of the radionuclide or its symbol;
- the activity of the contents;
- prescribed code letters if the material is low activity material; and
- a transport index.

Discussion:

- WHMIS does not apply to radioactive prescribed substances and has no equivalent hazard symbol.
- Labels required pursuant to AEC and Transport Packaging of Radioactive Materials Regulations are largely in code rather than descriptive and do not include reference to a material safety data sheet.

FIGURE 15

RADIATION SYMBOL


60°
60°
A
$\frac{A}{2}$
5A

A = Radius of Central Disc.

Note: Construction lines do not appear in actual symbol.

A.5 THE EXPLOSIVES ACT

Pursuant Regulations:

Explosive Regulations.

Application:

Manufacture and sale of explosives. **(NOTE: The Explosives Regulations also deal with the packing for and road transport of explosives. However, the Transportation of Dangerous Goods Regulations are intended to supersede requirements of the Explosives Regulations in these areas.)**

Responsibility for Labelling:

Manufacturer and sender.

Definition of Explosive:

Any substance that is made, manufactured or used to produce an explosion or detonation or a pyrotechnic effect and includes gunpowder, propellant powders, blasting agents, dynamite, detonating cord, lead azide, detonators, ammunition, rockets, fireworks, safety flares or other signals.

Section 6 of the regulations divides explosives into seven Classes.

1. Gunpowder
2. Nitrate Mixture
3. Nitro-compound
4. Chlorate Mixture
5. Fulminate
6. Ammunition
7. Fireworks

Information Required on Label:

Section 45 of the regulations covers requirement for the marking of outer packages containing explosives. The word "EXPLOSIVE", the number of the Class and Division to which the explosive belongs, the name of the manufacturer or sender of the explosive and other markings and serial numbers that may be required must be affixed to the package in conspicuous characters by means of a brand, or securely attached label or mark. Some exceptions to this requirement include:

- For Class 3 and 4 explosives, a date of manufacture must be provided.
- For safety fuses or gunpowder, the word "EXPLOSIVE" and the number and Class of the Division may be omitted.
- For manufactured fireworks, the word "EXPLOSIVE" must be replaced by the word "FIREWORKS".

Discussion:

- WHMIS does not apply to explosives and has no equivalent hazard symbol.
- Labels required for explosives are largely in code rather than descriptive and do not include reference to a material safety data sheet.

A.6 FOOD AND DRUGS ACT

Pursuant Regulations:

Food and Drug Regulations.
Cosmetic Regulations.

Application:

Drugs, cosmetics, foods and devices in Canadian commerce.

Responsibility for Labelling:

Manufacturer and distributor.

Information Required on Label:

For drugs, labels must include:

- the name of the manufacturer or distributor of the drug;
- common names where they exist;
- drug identification numbers (DIN);
- quantities and common names for medicinal ingredients;
- adequate directions for use; and
- the expiration date of the drug.

For cosmetics, labels must provide:

- the name and principal address of the manufacturer or distributor;
- common or generic name;
- warnings of skin hypersensitivity with hair dyes that contain paraphenylenediamine or other coal tar products; and
- where the cosmetic is packaged in a metal dispensing container designed to release contents under pressure by means of a manually operated valve, a warning of explosive hazard as required by the Hazardous Products Regulations.

Format:

Mixed language and UN-type symbol.

Discussion:

Differences between labels required under the Food and Drugs Act and WHMIS supplier labels include:

- FDA labelling requirements are not directed specifically to the workplace but are concerned with movement through commerce;
- FDA labels do not include reference to material safety data sheets;
- FDA labels do not require the use of hazard symbols except where a cosmetic is packaged in a pressurized dispensing container; and
- particularly with cosmetics, hazardous ingredients, risk phrases or precautionary statements are almost never provided.

APPENDIX B

LABELLING REQUIREMENTS AND STANDARDS OUTSIDE CANADA

B.1 TOXIC AND HAZARDOUS SUBSTANCES - HAZARD COMMUNICATION STANDARD - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (USA)

Application:

Workplace in United States.

Responsibility for Labelling:

Manufacturer or employer.

Hazardous Substance Definition:

Hazards are broken down into three general categories:

1. Physical/Chemical, corrosive, explosive, flammable, oxidizers;
2. Acute Health, for highly toxic and toxic chemical hazards based on LD_{50} values, category also includes sensitizers and irritants; and
3. Chronic Health, for carcinogens, reproductive toxicity hazards, and agents which endanger life, diminish mental alertness or cause other chronic problems like pulmonary, liver and toxicity.

Information Required on Label:

- Common name of substance above specified concentration.
- 18 hazard warnings ranging from flammable to carcinogen.
- Chemical abstract number.
- Handling and emergency precautions.

Format:

- Language format.
- Data sheets.

Discussion:

Chemical manufacturers, importers or distributors must ensure that each container of hazardous chemicals leaving the workplace is "labelled, tagged or marked" with the:

- identity of the hazardous chemical(s);
- appropriate hazard warnings; and

- name and address of the chemical manufacturer, importer or other responsible party.

Employers must ensure that each container of hazardous chemicals in the workplace is "labelled, tagged or marked" with the:

- identity of the hazardous chemical(s); and
- appropriate hazard warnings.

Labels need not refer to material safety data sheets.

B.2 EUROPEAN ECONOMIC COMMUNITY DIRECTIVE ON DANGEROUS SUBSTANCES (EEC)

Application:

Legislation protecting public and workers in the EEC.

Responsibility for Labelling:

Supplier.

Hazardous Substance Definition:

A substance is "dangerous" if it is explosive, oxidizing, flammable, toxic, harmful, corrosive, or irritant.

Information Required on Label:

- The name of the substance.
- The name and address of the manufacturer, importer or distributor.
- Hazard type (five Classes -- explosive, oxidizing, flammable, toxic and harmful, corrosive and irritant substances).
- Particular risks, e.g. "very toxic in contact with the skin".
- Safety precautions, e.g. "wear suitable protective clothing".

Format:

- Combination of language plus six EEC symbols.
- 42 uniform risk phases prescribed.
- 43 standard safety precaution phases prescribed.

Discussion:

The EEC Directives are similar to the UN recommendations in terms of symbols and classification systems. There are a number of differences between the EEC and other systems. The EEC standard is limited to approximately 900 chemicals and does not include mixtures. EEC labels tend to warn about potential hazards but contain few hazard control statements.

B.3 STANDARD SYSTEM FOR THE IDENTIFICATION OF THE FIRE HAZARDS OF MATERIALS - NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD 704

Application:

Firefighters during fire emergencies. Guideline only.

Hazardous Substance Definition:

Flammable liquids, gases and volatile solids.

Information Required on Label:

- Identify hazard "Health", "Flammability", "Reactivity" and "Special Hazards" (such as radioactivity and reactivity with water).
- Degree of severity of hazard 0-4 (five Divisions).
- Colour code is used to identify the type of hazard.

Format:

- Colour, code format.
- Blue signifies health hazard, red signifies a flammability hazard, yellow signifies a reactivity hazard.

Discussion:

The NFPA system is a code system intended primarily to provide protection for emergency response personnel, and does not provide descriptive information on the hazardous substance.

The health hazard rating is based on the concept that a firefighter will normally receive a single exposure of short duration, e.g. a few seconds up to 60 minutes. In contrast, workers routinely working with hazardous materials can be exposed for the duration of their working lives.

If the NFPA system were to be used on workplace labels, a strong training program would have to be provided by the employer to ensure that workers are aware at all times of the meaning of colours, the relative hazard inferred by numbers, the code descriptors appropriate to each number, and the differences between the WHMIS and NFPA systems. Worker understanding of hazards represented by a product must not be less than that communicated by WHMIS supplier labels and data sheets. See Figure 16 for label formats and code descriptors.

FIGURE 16

LABEL FORMAT PURSUANT TO NFPA STANDARD 704

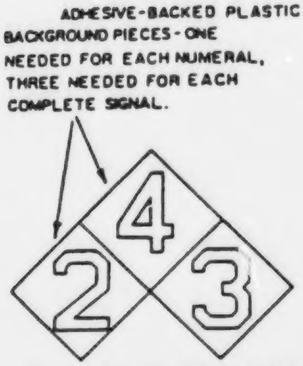

ADHESIVE-BACKED PLASTIC BACKGROUND PIECES - ONE NEEDED FOR EACH NUMERAL, THREE NEEDED FOR EACH COMPLETE SIGNAL.
4
2
3

Fig. 1. For Use Where Specified Color Background is Used with Numerals of Contrasting Colors.

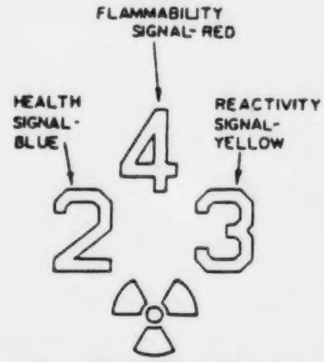


Fig. 2. For Use Where White Background is Necessary.

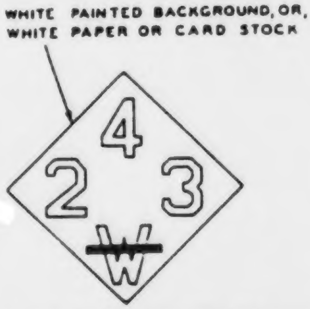


Fig. 3. For Use Where White Background is Used With Painted Numerals, or, For Use When Signal is in the Form of Sign or Placard

CODE DESCRIPTORS

Identification of Health Hazard Color Code: BLUE		Identification of Flammability Color Code: RED		Identification of Reactivity (Stability) Color Code: YELLOW	
Signal	Type of Possible Injury	Signal	Susceptibility of Materials to Burning	Signal	Susceptibility to Release of Energy
4	Materials which on very short exposure could cause death or major residual injury even though prompt medical treatment were given.	4	Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.	4	Materials which in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Materials which on short exposure could cause serious temporary or residual injury even though prompt medical treatment were given.	3	Liquids and solids that can be ignited under almost all ambient temperature conditions.	3	Materials which in themselves are capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
2	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.	2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	2	Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Also materials which may react violently with water or which may form potentially explosive mixtures with water.
1	Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.	1	Materials that must be preheated before ignition can occur.	1	Materials which in themselves are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.
0	Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.	0	Materials that will not burn.	0	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

B.4 AMERICAN NATIONAL STANDARD FOR HAZARDOUS INDUSTRIAL CHEMICALS - PRECAUTIONARY LABELLING (ANSI STANDARD Z129.1-1982)

Application:

Industrial workplace. Recommendation only.

Responsibility for Labelling:

Manufacturer.

Hazardous Substance Definition:

A chemical or mixture of chemicals that is toxic, highly toxic, irritant, corrosive, a strong oxidizer, a strong sensitizer, combustible, flammable, extremely flammable, dangerously reactive, or pressure-generating, or which otherwise may cause substantial personal injury or illness during or as a direct result of any customary or reasonable foreseeable handling or use.

Information Required on Label:

- Identify primary hazardous ingredients.
- Signal word -- Danger! Warning! Caution! and statement of hazards.
- Precautions, e.g. Keep away from Heat, Sparks and Open Flame!
- First aid treatment and notes to physician.
- Instructions in case of fire, spill or leak.
- Instructions for container handling and storage.
- For highly toxic chemicals, the word "poison" and skull and crossbones symbol.

Format:

Language format.

Discussion:

The ANSI Standard was developed by a technical committee of the Chemical Manufacturers' Association (US) and relies strongly on the selection of simple phrases to provide label warnings. This simplicity and directness can reduce confusion which is sometimes found with colour and code formats of NFPA. However, the system does not require the preparation of data sheets. See Figure 17 for a sample label.

FIGURE 17

SAMPLE LABELS BASED ON ANSI STANDARD Z129.1-1982

HAZARD:
Toxic by Inhalation

WARNING! HARMFUL IF INHALED

Avoid breathing (dust, mist, vapor, gas.)[*]
Keep container closed.
Use with adequate ventilation.

FIRST AID: If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

HAZARDS:
Corrosive, Eye and Skin
Known to Cause Cancer in Laboratory
Animals but not Known to Cause
Cancer in Humans

DANGER! CAUSES BURNS

POSSIBLE CANCER HAZARD BASED ON TESTS
WITH LABORATORY ANIMALS
OVEREXPOSURE MAY CREATE CANCER RISK

Do not get in eyes, on skin, on clothing.
Do not breathe (dust, vapor, mist, gas).[*]
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FIRST AID: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. (Destroy contaminated shoes.)[†] (Thoroughly clean shoes before reuse.)[†]

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[*] Select applicable word or words.
[†] Use phrase when appropriate.

CHAPTER 4

THE MATERIAL SAFETY DATA SHEET

CONTENTS

Page

4.1 INTRODUCTION 1

4.1.1 CHAPTER OBJECTIVES 1

4.1.2 WHAT IS A MATERIAL SAFETY DATA SHEET? 2

4.1.3 THE PURPOSE OF THE DATA SHEET 2

4.2 RESPONSIBILITY FOR THE PRODUCTION AND AVAILABILITY OF DATA SHEETS 4

4.2.1 THE SUPPLIER 4

4.2.2 THE EMPLOYER 7

4.2.3 THE WORKER 11

4.3 MATERIAL SAFETY DATA SHEET CONTENT, DESIGN AND COMPLETION 12

4.3.1 CONTENT CATEGORIES AND INFORMATION ITEMS 12

4.3.2 DESIGN OF THE DATA SHEET 16

4.3.3 COMPLETING THE DATA SHEET 24

- General Requirements 24
- Specific Requirements 27

1. Section 1: Product Information 27
2. Section 2: Hazardous Ingredients 32
3. Section 3: Physical Data 36
4. Section 4: Fire and Explosion Data 41
5. Section 5: Reactivity Data 45
6. Section 6: Toxicological Properties 47
7. Section 7: Preventive Measures 54
8. Section 8: First Aid Measures 58
9. Section 9: Preparation Date of the MSDS 59

4.3.4 THE GENERIC MATERIAL SAFETY DATA SHEET 60

Page

APPENDIX A - INGREDIENT DISCLOSURE LIST 61

FIGURES

1 The MSDS Decision Sequence for the Supplier 6

2 The MSDS Decision Sequence for the Employer 10

3 Types of Information on the Material Safety Data Sheet (as Listed in Schedule I of CPR) 14

4 Acceptable Format for the Material Safety Data Sheet 19

4.1 INTRODUCTION

4.1.1 CHAPTER OBJECTIVES

Objectives	Location in Chapter
To explain what a material safety data sheet (MSDS) is, its purpose and limitations.	4.1.2 4.1.3
To define the responsibilities of the supplier and employer for the production and supply of data sheets, and the role of the worker.	4.2.1 4.2.2 4.2.3
To describe the nine categories on the MSDS and list the approximately fifty information items included within them.	4.3.1
To review requirements and recommendations for the design of the MSDS, and to provide a sample of acceptable MSDS format.	4.3.2
To provide detailed information about the content required in each of the information items on the data sheet.	4.3.3
To discuss what is meant by the generic MSDS and the situations in which its use is permitted.	4.3.4
To provide a copy of the **Ingredient Disclosure List** issued 31 December 1987 for assistance in determining hazardous ingredients to be listed on the MSDS.	Appendix A

4.1.2 WHAT IS A MATERIAL SAFETY DATA SHEET?

A material safety data sheet is a technical document which provides detailed and comprehensive information on a controlled product related to:

- health effects of overexposure to the product;
- hazard evaluation related to the product's handling, storage or use;
- measures to protect workers at risk of overexposure; and
- emergency procedures.

The data sheet may be written, printed or otherwise expressed, and must meet the availability, design and content requirements of WHMIS legislation. The legislation provides for flexibility of design and wording but requires that a minimum number of categories of information be completed and that all hazardous ingredients meeting certain criteria be listed subject to exemptions granted under the Hazardous Materials Information Review Act.

4.1.3 THE PURPOSE OF THE DATA SHEET

The data sheet is the second element of the WHMIS information delivery system and is intended to supplement the alert information provided on labels. The third element of the system is the education of workers in hazard information on controlled products, including instruction in the content and significance of information on the material safety data sheet.

The data sheet is:

An essential starting point in the development of a worksite program for the safe use of controlled products:

1. as a technical information reference;
2. as a document which can be distributed for the use of persons with responsibilities related to its content; for example, health and safety coordinators and committees, first aid personnel, fire response teams, and in work areas where the product is used;
3. as a starting point for the implementation of control measures to protect workers;
4. as a key element of worker education; and
5. as a means of easily updating a program when revisions to data sheets come available.

The data sheet is not:

1. A document intended to represent all the information needed for the safe use of a product. Circumstances of product use and the potential for worker exposure vary from one work location to another. The variety of required protective measures cannot be anticipated through one sheet. Further, it is often necessary to develop jobsite instruction materials and written work procedures based on the data sheet which provide direction to workers in plain language.

2. A document only to be read and filed. It is essential that the data sheet be translated into an active program of worker protection.

4.2 RESPONSIBILITY FOR THE PRODUCTION AND AVAILABILITY OF DATA SHEETS

The supplier and employer each have responsibilities that must be met to ensure the proper implementation of the WHMIS material safety data sheet system.

4.2.1 THE SUPPLIER

The supplier must:

1. Develop or obtain a material safety data sheet for each controlled product imported or sold for use in a workplace as required by Sections 13(a) and 14(a) of the Hazardous Products Act and Part I of the *Controlled Products Regulations*. This applies to all products except those which are:
   - from a laboratory supply house, packaged in less than 10 kilogram quantities, intended for laboratory use and labelled as per CPR, Section 10 **(i.e. display all information required for a data sheet)**; or are
   - laboratory samples, packaged in less than 10 kg quantities and labelled as per CPR, Section 16* as shown on page 3-16 of this Manual.
2. Ensure that the material safety data sheet for a controlled product:
   - discloses information that is current at the time of sale or importation of the product;
   - was prepared and dated not more than three years before the date of sale or importation; and
   - is available in both official languages, English and French, at the time of sale or importation.
3. Transmit to the purchaser, on or prior to the date of sale of a controlled product, a copy of a current material safety data sheet, unless the purchaser has already received it. The data sheet must be provided in the official language or languages requested by the purchaser.

---

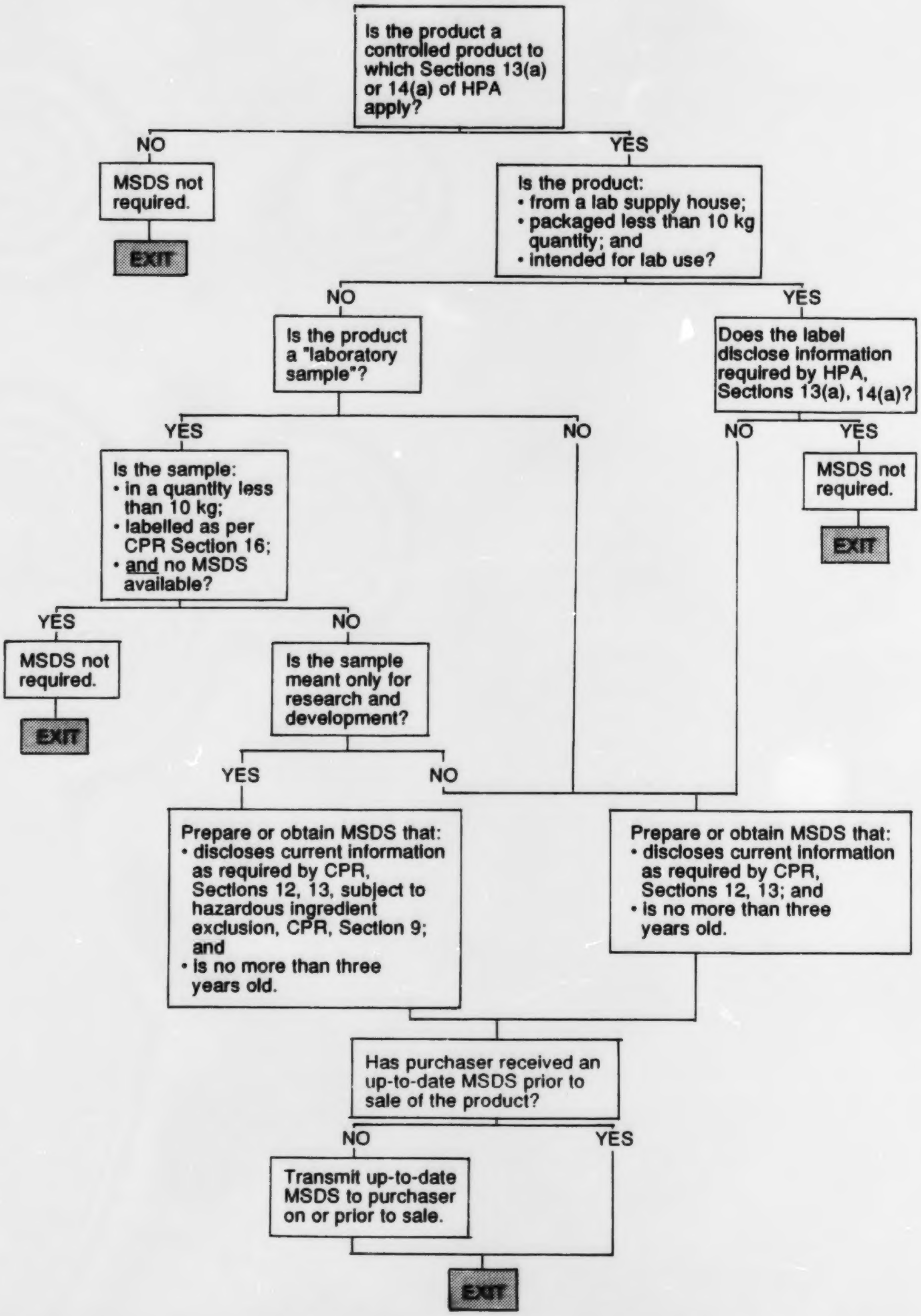
* If laboratory samples are intended for research and development, and an MSDS is required, the data sheet need not disclose the chemical identity of ingredients if the generic chemical identity is disclosed. (Reference: CPR, Section 9)

4. Subject to the Hazardous Materials Information Review Act, identify, on the request of an inspector:
   - any person to whom a controlled product is sold;
   - any user of a controlled product; or
   - the source of information for any toxicological data used in the preparation of any data sheet pursuant to paragraph 13(a) of the Hazardous Products Act or has been obtained or prepared by the supplier pursuant to paragraph 14(a) of the Act.
5. Provide any information referred to in paragraph 13(a) of the Act that is in the possession of the supplier to any physician or nurse who requests that information for the purpose of making a medical diagnosis or providing medical treatment in an emergency.

Supplier responsibilities to develop and provide data sheets are summarized in the Decision Tree in Figure 1.

FIGURE 1

THE MSDS DECISION SEQUENCE FOR THE SUPPLIER


Is the product a controlled product to which Sections 13(a) or 14(a) of HPA apply?
NO
MSDS not required.
EXIT
YES
Is the product:
• from a lab supply house;
• packaged less than 10 kg quantity; and
• intended for lab use?
NO
Is the product a "laboratory sample"?
YES
Does the label disclose information required by HPA, Sections 13(a), 14(a)?
YES
Is the sample:
• in a quantity less than 10 kg;
• labelled as per CPR Section 16;
• and no MSDS available?
NO
NO
YES
MSDS not required.
EXIT
YES
MSDS not required.
EXIT
NO
Is the sample meant only for research and development?
YES
NO
Prepare or obtain MSDS that:
• discloses current information as required by CPR, Sections 12, 13, subject to hazardous ingredient exclusion, CPR, Section 9; and
• is no more than three years old.
Prepare or obtain MSDS that:
• discloses current information as required by CPR, Sections 12, 13; and
• is no more than three years old.
Has purchaser received an up-to-date MSDS prior to sale of the product?
NO
YES
Transmit up-to-date MSDS to purchaser on or prior to sale.
EXIT

4.2.2 THE EMPLOYER

The employer must:

1. Ensure that an up-to-date supplier material safety data sheet is obtained from a supplier the first time a controlled product is received in the workplace.

2. Evaluate the data sheet received to determine its date of production.

3. Take steps to obtain from a supplier an up-to-date supplier data sheet when the data sheet available at the worksite bears a date of production three years or more old.

4. Add any new hazard information to the supplier data sheet on the basis of the ingredients already disclosed on the document if the supplier is unable to provide an updated data sheet (for reasons such as having gone out of business or no longer producing the material in question).

5. Prepare a material safety data sheet which discloses the information required by the *Controlled Products Regulations* where the employer produces a controlled product in the workplace other than a fugitive emission, or intermediate products undergoing reaction within a reaction vessel.*

6. Update such employer -- prepared data sheets:

    - as soon as practical but not later than 90 days after new hazard information becomes available to the employer; and

    - at least every three years.

---

* This exemption applies only to intermediate products formed and consumed during reaction inside the vessel.

7. Ensure that a copy of all data sheets which are required for the workplace are made readily available at the worksite to:

   - workers who may be exposed to the controlled product; and
   - the joint health and safety committee, if any, or to a health and safety representative, if any.

   NOTE: "Readily available" means the data sheet must be located close to workers, in a physical copy form (i.e. printed on paper), and accessible to workers during each shift. For example, it is not acceptable to keep data sheets in an office that is remote from the shop floor, or that is locked during the night shift.

   Data sheets may be made available on a computer terminal if the employer takes all reasonable steps to keep the terminal in working order, makes the material safety data readily available on the request of an employee and provides training in accessing computer-stored data sheets to an employee at the worksite where the data sheet is available on a computer terminal, and to members of the health and safety committee or to the health and safety representative. It is recommended that at least one person who is capable of accessing computer-stored data sheets be present on each shift.

8. Ensure that a worker who works with a controlled product or in proximity to a controlled product is instructed in:

   - the content required on a material safety data sheet; and
   - the purpose and significance of information contained in it.

   Instruction must ensure that workers know procedures for the safe use, storage, handling and disposal of controlled products including procedures in the event of emergency involving a controlled product. Refer to Chapter 5 of this Manual for information on "Worker Education".

9. Provide information in the employer's possession on any controlled product in the workplace, including confidential business information, to a doctor or nurse who requests information on the product for the purposes of making a medical diagnosis or rendering medical treatment in an emergency.

10. In circumstances where the supplier makes an MSDS available to an employer, that employer may provide a data sheet different in format from the supplier data sheet or containing additional hazard information as long as the data sheet provided by the employer:

    - contains no less content than the supplier MSDS unless a claim for exemption is filed in accordance with the Hazardous Materials Information Review Act

      and

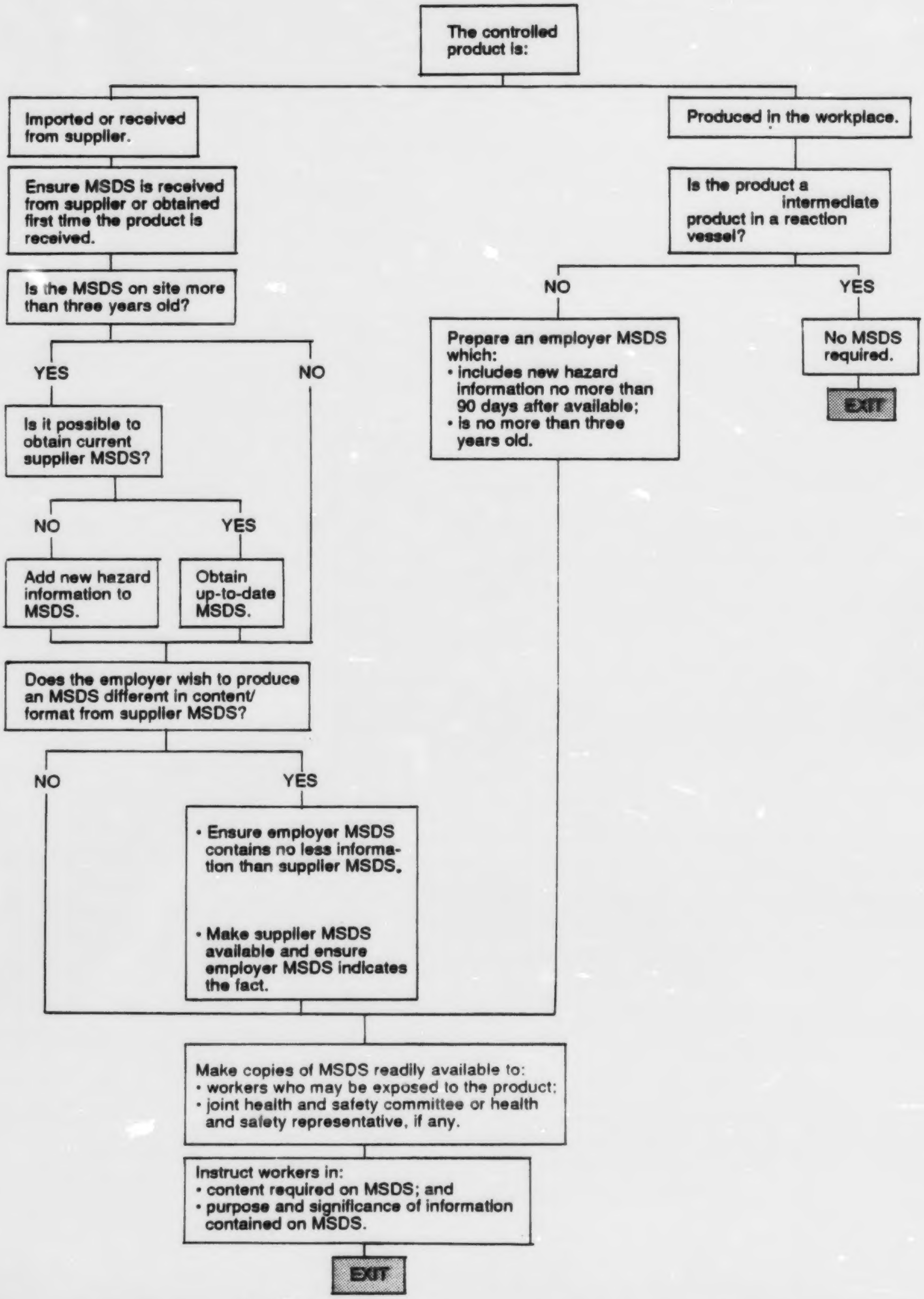
    - the supplier MSDS is available at the workplace and the employer-provided MSDS indicates that fact.

Employer-produced data sheets have the advantage of being able to include local regulatory requirements (e.g. exposure limits and waste disposal requirements) and incorporating information on hazards and control measures specific to the circumstances at the worksite.

Employer responsibilities to prepare and provide data sheets, and to instruct workers are summarized in the Decision Sequence in Figure 2.

FIGURE 2

THE MSDS DECISION SEQUENCE FOR THE EMPLOYER


The controlled product is:
Imported or received from supplier.
Produced in the workplace.
Ensure MSDS is received from supplier or obtained first time the product is received.
Is the product a intermediate product in a reaction vessel?
Is the MSDS on site more than three years old?
NO
YES
YES
NO
Prepare an employer MSDS which:
• includes new hazard information no more than 90 days after available;
• is no more than three years old.
No MSDS required.
EXIT
Is it possible to obtain current supplier MSDS?
NO
YES
Add new hazard information to MSDS.
Obtain up-to-date MSDS.
Does the employer wish to produce an MSDS different in content/ format from supplier MSDS?
NO
YES
• Ensure employer MSDS contains no less information than supplier MSDS.
• Make supplier MSDS available and ensure employer MSDS indicates the fact.
Make copies of MSDS readily available to:
• workers who may be exposed to the product;
• joint health and safety committee or health and safety representative, if any.
Instruct workers in:
• content required on MSDS; and
• purpose and significance of information contained on MSDS.
EXIT

4.2.3 THE WORKER

The worker does not have direct responsibilities to prepare and supply material safety data sheets. However, various workers do have roles regarding provision of information on data sheets at the worksite.

1. The worker who is a health and safety representative or is a member of the joint health and safety committee will have all data sheets required at that workplace made readily available to him or her. It is not possible to advise on safe work procedures with a controlled product without knowledge of the relevant information from the data sheet.

2. Where the employer wishes to make a material safety data sheet available in the workplace on a computer terminal, the worker(s) who are, as required by WHMIS, trained in the terminal's use must be prepared to assist making a data sheet readily available on request.

3. The joint health and safety committee, if any, or health and safety representative, if any, must be consulted at least annually by the employer with regards to instruction provided to employees concerning controlled products. This consultation may involve consideration of instruction on data sheets. See Chapter 5, "Worker Education".

4.3 MATERIAL SAFETY DATA SHEET CONTENT, DESIGN AND COMPLETION

4.3.1 CONTENT CATEGORIES AND INFORMATION ITEMS

A supplier material safety data sheet must provide at least nine categories or sections of content and approximately sixty items of information distributed among those categories. The categories must have the following or similar headings.

1. Product Information:

   Including product identifiers, manufacturer and supplier names, addresses and emergency telephone numbers.

2. Hazardous Ingredients:

   A list of ingredients as required under subparagraphs 13(a)(i) to (iv) of the Hazardous Products Act.

3. Physical Data:

   A variety of parameters such as physical state, odour, boiling point, etc. that physically characterize the product.

4. Fire and Explosion Hazard:

   Characteristics of the substance that determine the likelihood of its ignition in various conditions, and information on the means of extinction.

5. Reactivity Data:

   Information regarding the chemical instability of the product and chemicals with which it may dangerously react.

6. Toxicological Properties:

   Information on how the product is likely to enter the body and on the short-term (acute) and long-term (chronic) health effects from exposure to it.

7. Preventive Measures:

   Personal protective equipment, handling procedures and engineering controls to be used during the product's shipping, storage, use and disposal, and in emergency circumstances of leak, spill or other release.

8. First Aid Measures:

   Specific first aid measures related to acute effects of overexposure to the product.

9. Preparation Information:

   Identification of those responsible for the data sheet and date of preparation.

Figure 3 provides a list of the elements or items of information which are identified in Schedule I to the *Controlled Products Regulations* for inclusion among the nine major sections on the data sheet. In addition, the data sheet must show any other hazard information about the controlled product of which the supplier is aware or ought reasonably to be aware.

FIGURE 3

TYPES OF INFORMATION ON THE MATERIAL SAFETY DATA SHEET (AS LISTED IN SCHEDULE I OF CPR)

	Category/Section	Information Item
1.	Product Information	• Product identifier • Product use • Manufacturer's name, street address, city, province, postal code and emergency telephone number • Supplier identifier and the supplier's street address, city, province, postal code and emergency telephone number • Product identification number (PIN)
2.	Hazardous Ingredients	• Information required by subparagraphs 13(a)(i) to (iv) or paragraph 14(a) of the Hazardous Products Act • CAS number • LD_{50} (species and route) • LC_{50} (species and route)
3.	Physical Data	• Physical state (gas, liquid or solid) • Odour and appearance • Odour threshold • Vapour pressure • Vapour density • Evaporation rate • Boiling point • Freezing point • pH • Specific gravity • Coefficient of water/oil distribution
4.	Fire or Explosion Hazard	• Conditions of flammability • Means of extinction • Flashpoint and method of determination • Upper flammable limit (% by volume) • Lower flammable limit (% by volume) • Auto-ignition temperature • Hazardous combustion products • Explosion data -- sensitivity to mechanical impact • Explosion data -- sensitivity to static discharge

FIGURE 3 CONTINUED

TYPES OF INFORMATION ON THE MATERIAL SAFETY DATA SHEET (AS LISTED IN SCHEDULE I OF CPR)

Category/Section	Information Item
5. Reactivity Data	• Conditions under which the product is chemically unstable • Name of any substance or class of substance with which the product is incompatible • Conditions of reactivity • Hazardous decomposition products
6. Toxicological Properties	• Route of entry, including skin contact, skin absorption, eye contact, inhalation and ingestion • Effects of acute exposure to product • Effects of chronic exposure to product • Exposure limits • Irritancy of product • Sensitization to product • Carcinogenicity • Teratogenicity • Reproductive toxicity • Mutagenicity • Name of toxicologically synergistic products
7. Preventive Measures	• Personal protective equipment to be used • Specific engineering controls to be used • Procedures to be followed in case of leak or spill • Waste disposal • Handling procedures and equipment • Storage requirements • Special shipping information
8. First Aid Measures	• Specific first aid measures
9. Preparation Information	• Name and phone number of group, department or party responsible for preparation of MSDS • Date of preparation

4.3.2 DESIGN OF THE DATA SHEET

1. Performance Based Design

The design of the material safety data sheet is performance based; that is, the supplier may adopt any design as long as all the necessary information sections and items are included and completed. Information items may appear in the section to which they are assigned in Figure 3 or in any other appropriate section, except in two cases:

- Hazardous ingredients must always be listed in the "Hazardous Ingredients" section.
- The name and phone number of the group, department or party responsible for the preparation of the data sheet, and the date of data sheet preparation must always appear in the "Preparation Information" section.

Information disclosed under one heading is not required to be disclosed under another.

2. Headings

Each of the nine categories/sections of information shown in Figure 3 must be identified by a heading identical or similar to that shown in the Figure. For example, the section "Product Information" could display the heading "Product Information" or the similar heading "Product Identification and Use". The headings may have different emphases; i.e. some may appear as subheadings as long as all appear.

It is not acceptable to:

a) Combine two headings into one, unless the information contained under the combined heading includes required subheadings similar to those shown in Figure 3. For example, if "Toxicological Properties" and "First Aid Measures" were combined into the single heading "Toxicological and First Aid Information", then the subheadings "Toxicological Properties" and "First Aid Measures" or similar subheadings would also have to appear.

b) Replace a required heading with a variety of other headings. For example, it is not permissible to replace the heading "Preventive Measures" with the headings:

- "Special Protection Information"
- "Special Precautions"
- "Spill or Leak Procedures"

3. Languages

The supplier material safety data sheet must be available in both English and French at the time of sale or importation. The supplier must provide an MSDS in the official language, or languages, requested by the purchaser. Where no preference is stated, the data sheet should be provided in the language used in the course of the business transaction. A request for an MSDS in both languages can be met by having both languages on one MSDS or separately on two.

4. Use of Borders or Symbols

The supplier or employer may wish to emphasize the fact that the data sheet is part of the WHMIS system by use of the distinctive border design required for WHMIS supplier labels. If so, the design should not extend around the entire perimeter of the data sheet in order to avoid confusion with the requirement that labels be completely enclosed by such a border.

A supplier or employer may also wish to apply to the data sheet a miniature duplicate of the label for the product or a copy of hazard symbol(s) depicting the Class(es) to which the product belongs. This addition would reinforce the link between label and data sheet intended in the WHMIS system and could assist with prompt recognition of primary hazard(s). However, it is essential that such additions neither obscure nor become a substitute for information required on the material safety data sheet.

5. Example of an Acceptable Format

To assist suppliers and employers, an acceptable format for the data sheet is provided on page 4-20. In this format:

a) The sequence of sections follows a natural process of:

   - identification and recognition of the product (Sections 1-3);
   - evaluation of the risk (Sections 2-6);
   - preventive measures (Section 7);
   - first aid measures in the event of misuse (Section 8).

b) Information sections which are likely to receive joint use in the workplace are clustered in the same area of the sheet; for example, Sections 3 (Fire and Explosion Hazard) and 4 (Reactivity); Sections 6 (Toxicological Properties) and 8 (First Aid Measures).

c) The supplier is able to provide data sheets in both official languages with one printing through the use of the turn and tumble format (four-page production with creased centreline).

NOTE: One disadvantage of the two-page data sheet is the limitation on space. Many suppliers and employers use a longer or open-ended format to permit easy inclusion of all required information.

FIGURE 4

ACCEPTABLE FORMAT FOR THE MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

SECTION 1 — PRODUCT IDENTIFICATION AND USE

PRODUCT IDENTIFIER ▶	PRODUCT IDENTIFICATION NUMBER (PIN)
PRODUCT USE ▶	

MANUFACTURER'S NAME		SUPPLIER'S NAME	
STREET ADDRESS		STREET ADDRESS	
CITY	PROVINCE	CITY	PROVINCE
POSTAL CODE	EMERGENCY TELEPHONE NO.	POSTAL CODE	EMERGENCY TELEPHONE NO.

SECTION 2 — HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	%	CAS NUMBER	LD_{50} OF INGREDIENT (SPECIFY SPECIES AND ROUTE)	LC_{50} OF INGREDIENT (SPECIFY SPECIES)

SECTION 3 — PHYSICAL DATA

PHYSICAL STATE	ODOUR AND APPEARANCE			ODOUR THRESHOLD (ppm)
VAPOUR PRESSURE (mm Hg)	VAPOUR DENSITY (AIR=1)	EVAPORATION RATE	BOILING POINT(°C)	FREEZING POINT(°C)
pH	SPECIFIC GRAVITY	COEFF. WATER/OIL DIST.		

SECTION 4 — FIRE AND EXPLOSION DATA

FLAMMABILITY
YES ☐ NO ☐ IF YES, UNDER WHICH CONDITIONS? ▶

MEANS OF EXTINCTION

FLASHPOINT (°C) AND METHOD	UPPER FLAMMABLE LIMIT (% BY VOLUME)	LOWER FLAMMABLE LIMIT (% BY VOLUME)
AUTOIGNITION TEMPERATURE (°C)	HAZARDOUS COMBUSTION PRODUCTS	
EXPLOSION DATA ▶ SENSITIVITY TO IMPACT	SENSITIVITY TO STATIC DISCHARGE	

SECTION 5 — REACTIVITY DATA

CHEMICAL STABILITY
YES ☐ NO ☐ IF NO, UNDER WHICH CONDITIONS? ▶

INCOMPATIBILITY WITH OTHER SUBSTANCES
YES ☐ NO ☐ IF SO, WHICH ONES? ▶

REACTIVITY, AND UNDER WHAT CONDITIONS

HAZARDOUS DECOMPOSITION PRODUCTS

PRODUCT IDENTIFIER ▶

SECTION 6 — TOXICOLOGICAL PROPERTIES

ROUTE OF ENTRY

SKIN CONTACT ☐ SKIN ABSORPTION ☐ EYE CONTACT ☐ INHALATION ☐ INGESTION ☐

EFFECTS OF ACUTE EXPOSURE TO PRODUCT

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT

EXPOSURE LIMITS	IRRITANCY OF PRODUCT	SENSITIZATION TO PRODUCT	CARCINOGENICITY
TERATOGENICITY	REPRODUCTIVE TOXICITY	MUTAGENICITY	SYNERGISTIC PRODUCTS

SECTION 7— PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT:

GLOVES (SPECIFY)	RESPIRATOR (SPECIFY)	EYE (SPECIFY)
FOOTWEAR (SPECIFY	CLOTHING (SPECIFY)	OTHER (SPECIFY)

ENGINEERING CONTROLS (SPECIFY, EG. VENTILATION, ENCLOSED PROCESS.)

LEAK AND SPILL PROCEDURE

WASTE DISPOSAL

HANDLING PROCEDURES AND EQUIPMENT

STORAGE REQUIREMENTS

SPECIAL SHIPPING INFORMATION

SECTION 8 — FIRST AID MEASURES

SPECIFIC MEASURES

SECTION 9 — PREPARATION DATE OF MSDS

PREPARED BY (GROUP,DEPARTMENT, ETC.)	PHONE NUMBER	DATE

FICHE SIGNALÉTIQUE

SECTION 1 — IDENTIFICATION ET UTILISATION DU PRODUIT

NOM / IDENTIFICATEUR DU PRODUIT ▶	NUMÉRO D'IDENTIFICATION DU PRODUIT (NIP)
USAGE DU PRODUIT ▶	

NOM DU FABRICANT		NOM DU FOURNISSEUR	
NUMÉRO CIVIQUE		NUMÉRO CIVIQUE	
VILLE	PROVINCE	VILLE	PROVINCE
CODE POSTAL	NO. DE TÉLÉPHONE D'URGENCE	CODE POSTAL	NO. DE TÉLÉPHONE D'URGENCE

SECTION 2 — INGREDIENTS DANGEREUX

INGRÉDIENTS DANGEREUX	%	NUMÉRO CAS	DL_{50} (PRÉCISER L'ESPÈCE ET LA VOIE D'ADMINISTRATION	CL_{50} (PRÉCISER L'ESPÈCE)

SECTION 3 — CARACTÉRISTIQUES PHYSIQUES

ÉTAT PHYSIQUE	ODEUR ET APPARENCE			SEUIL DE L'ODEUR (ppm)
TENSION DE VAPEUR (mm Hg)	DENSITÉ DE LA VAPEUR (AIR=1)	TAUX D'ÉVAPORATION	POINT DE ÉBULLITION (°C)	POINT DE CONGÉLATION (°C)
pH	DENSITÉ	COEFF. DE RÉPARTITION EAU/HUILE		

SECTION 4 — RISQUES D'INCENDIE OU D'EXPLOSION

INFLAMMABILITÉ OUI ☐ NON ☐ SI OUI, DANS QUELLES CONDITIONS? ▶

MOYENS D'EXTINCTION

POINT D'ECLAIR (°C) ET METHODE DE DÉTERMINATION	SEUIL D'INFLAMMABILITÉ MAXIMAL (% PAR VOLUME)	SEUIL D'INFLAMMABILITÉ MINIMAL(% PAR VOLUME)
TEMPÉRATURE D'AUTO-INFLAMMATION (°C)	PRODUITS DANGEREUX DE COMBUSTION	

DONNES SUR LES EXPLOSIONS ▶ SENSIBILITÉ A L'IMPACT MÉCANIQUE | SENSIBILITÉ À UNE DÉCHARGE STATIQUE

SECTION 5— DONNÉS SUR LA RÉACTIVITÉ

STABILITÉ CHIMIQUE OUI ☐ NON ☐ SI NON, DANS QUELLES CONDITIONS? ▶

INCOMPATIBILITÉ AVEC D'AUTRES PRODUITS OUI ☐ NON ☐ SI OUI, LESQUELS? ▶

CONDITIONS DE RÉACTIVITÉ

PRODUITS DE DÉCOMPOSITION DANGEREUX

NOM / IDENTIFICATEUR DU PRODUIT ▸

SECTION 6 — PROPRIETES TOXICOLOGIQUES

VOIES D'ABSORPTION

CONTACT DERMIQUE ☐ ABSORPTION DERMIQUE ☐ CONTACT OCULAIRE ☐ INHALATION ☐ INGESTION ☐

EFFETS DE L'EXPOSITION AIGUË AU PRODUIT

EFFETS DE L'EXPOSITION CHRONIQUE AU PRODUIT

SEUILS LIMITES D'EXPOSITION	PROPRIÉTÉ IRRITANTE	SENSIBILISATION AU PRODUIT	CANCÉROGÉNICITÉ
TÉRATOGÉNICITÉ	EFFETS SUR LA REPRODUCTION	MUTAGÉNICITÉ	PRODUITS SYNERGIQUES

SECTION 7— MESURES PRÉVENTIVES

MATÉRIEL PERSONNEL DE PROTECTION:

GANTS (PRÉCISER)	APPAREIL RESPIRATOIRE (PRÉCISER)	APPAREIL OCULAIRE (PRÉCISER)
CHAUSSURES (PRÉCISER)	VÊTEMENTS (PRÉCISER)	AUTRES (PRÉCISER)

INSTALLATION TECHNIQUES

PROCÉDURES EN CAS DE FUITES ET DE DÉVERSEMENTS

ÉLIMINATION DES RÉSIDUS

MÉTHODES ET ÉQUIPMENT POUR LA MANUTENTION

EXIGENCES EN MATIÈRE D'ENTREPOSAGE

RENSEIGNEMENTS SPÉCIAUX EN MATIÈRE D'EXPÉDITION

SECTION 8— PREMIERS SOINS

PREMIERS SOINS PARTICULIERS À ADMINISTRER

SECTION 9— RENSEIGNEMENTS SUR LA PRÉPARATION DE LA FS

PRÉPAREE PAR (GROUPE, SERVICE, PERSONNE, ETC.)	NO. DE TÉLÉPHONE	DATE

4.3.3 COMPLETING THE DATA SHEET

This Part describes general requirements for filling out data sheets and the specific information expected for every information item listed in Schedule I of CPR (and shown in Figure 3). Discussion of information items is organized section by section for each of the nine sections of the data sheet using the format provided for the data sheet in Figure 4. Appendix B of Chapter 1, which provides definitions of technical and legal terms, may be helpful when reading this Part.

- General Requirements

1. **The information provided on the data sheet must incorporate and be consistent with all applicable information derived from the classification of the product.** Classification information can include:

   - results from testing carried out with respect to the product in accordance with Sections 34 to 66 of CPR;
   - evaluation and scientific judgement based on test results with respect to the product or on similar products, including the use of classification lists and, where appropriate, documentation for the lists; and
   - for Class D - Poisonous and Infectious Material, information of which the supplier is aware or ought reasonably to be aware.

   The supplier should be aware of information sources such as those available from the Canadian Centre for Occupational Health and Safety including the Chemical Information On-line and RTECS databases and from relevant publications of regulatory agencies, industry or trade associations and labour organizations that are related to occupational health and safety. Chapter 7 of this Manual provides listings of information sources and addresses of information agencies.

2. **Subject to the Hazardous Materials Information Review Act, the MSDS must disclose the identity of all ingredients in a controlled product as required by Section 13(a) of the Hazardous Products Act.** For the purposes of the application of Section 13(a) of HPA, the data sheet must disclose any of the ingredients in the Ingredient Disclosure List issued pursuant to Section 17 of HPA if those ingredients are present in concentrations greater than the concentrations by weight specified on the list. Appendix A to this Chapter provides a copy of the disclosure list issued 31 December 1987.

NOTE: Under Section 17(2) of HPA the Governor in Council may, after consultation, amend the list. Persons responsible for preparing and revising data sheets must incorporate applicable amendments.

3. **All information items listed in Figure 3 must be completed if they are available and applicable; none can be left blank.** If, for any item or category, information on the product is not available or applicable, the data sheet must indicate that fact, in English with the words "not available" or "not applicable"; in French with "pas disponible" or "sans objet" as the case may be.

   Short forms of these statements are allowed as long as they distinguish between the two. For example, in English the abbreviation n.a. is unacceptable, while n.av. and n.ap. are acceptable. In French, the short forms p.d. and s.o. are acceptable. Short forms should be explained on the data sheet.

   Available means that the person responsible for preparing the data sheet has the information or could obtain it. While the supplier need not test the product, information will often be available because the product will have been tested to determine if it meets some of the criteria. In addition, a reasonable search of the available literature must be undertaken. For assistance, see Chapter 7, "Resources".

   Applicable information is any information relevant to the safe handling, storage, use or disposal of the product. Careful professional judgement must be used when determining applicability. For example, the belief that "vapour pressure" is not applicable to solids can be wrong. If a solid is assigned a low exposure limit even a very small vapour pressure may be of concern. For example, if the vapour of the solid quinone filled an air space to its equilibrium vapour pressure, as might occur if quantities were spilled in an unventilated storage area, the concentration of quinone in air would be 300 times higher than the short-term exposure limit recommended by the ACGIH.

4. **Units of measurement must be identified where appropriate.** For example, if an exposure limit for a vapour in air is 200 parts per million, the unit abbreviation ppm must be provided to avoid confusion with a second common unit of measurement -- milligrams per cubic meter (mg/m^3).

5. **Information should be as specific as possible.** For example, if protective gloves are required when handling a product, it is of little assistance to merely indicate that fact. Gloves are available in a variety of materials (e.g. neoprene, polyvinyl chloride, butyl rubber, fluoroelastomer, etc.) which have different capabilities to resist chemical penetration. Information on preferred materials and, where appropriate, glove design is the type needed to properly assist the employer. The employer must, of course, adapt information from the MSDS to the specific circumstances of the workplace.

6. **Where information on the toxicological properties of a controlled product on the data sheet may be interpreted to qualify or contradict other toxicological information which appears, the data sheet must include enough information to ensure a person is not misled about the hazard.** The general impression the information conveys must be taken into account.

   For example, if results from toxicity testing of a product are inconclusive or conflicting it is important, when reporting this fact on the MSDS, that it not be done in a way that implies there is no hazard posed by the product (assuming that the product meets criteria for inclusion).

   General impressions can be created by style as well as wording. For example, if a product is rated as carcinogenic to humans by IARC but only as a suspect carcinogen by ACGIH it is appropriate, in the absence of further scientific information, to provide equal prominence to both judgements and not to highlight or footnote one relative to the other.

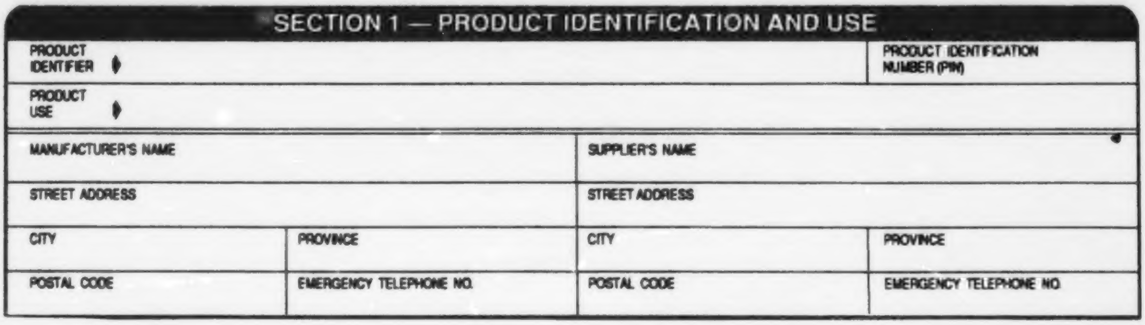
7. **Information required on the data sheet must not be disclaimed or contradicted by any other information which is not required but is disclosed.** Disclaimer statements are not required on data sheets. An unacceptable disclaimer statement is:

   > "Although this product meets the carcinogenicity criteria there is no proof that it causes cancer."

   NOTE: Disclaimer statements do not diminish in any way the responsibility of a supplier under HPA to provide accurate information.

- Specific Requirements

1. Section 1: Product Information



SECTION 1 — PRODUCT IDENTIFICATION AND USE

PRODUCT IDENTIFIER ➧			PRODUCT IDENTIFICATION NUMBER (PIN)
PRODUCT USE ➧			
MANUFACTURER'S NAME		SUPPLIER'S NAME	
STREET ADDRESS		STREET ADDRESS	
CITY	PROVINCE	CITY	PROVINCE
POSTAL CODE	EMERGENCY TELEPHONE NO.	POSTAL CODE	EMERGENCY TELEPHONE NO.

The intent of this section is to provide for product and manufacturer/supplier identification and a description of product use. It is of particular use in organizing data sheets for quick retrieval and in emergency circumstances for contact with the manufacturer and supplier.

a) Product Identifier

Identification of the product by generic name, trade name, brand name, common name, chemical name, code name or code number specified by the supplier.

The identifier on the data sheet must be identical with the identifier on the product label. In certain cases, a generic data sheet (i.e. one data sheet which applies to more than one product) may be permitted. The generic data sheet should list all the product identifiers that appear on the labels of the different products to which the data sheet applies. (See Part 4.3.4 of this Chapter, "The Generic MSDS".)

b) Product Identification Number (PIN)

Four-digit numbers for pure chemicals and groups of chemicals which can assist with locating hazard information. PIN's can be of UN (United Nations) or NA (North American) origin.

UN, and in some cases NA numbers, are used on labels and placards for the identification of dangerous goods in transport. Numbers of both designations are found in Schedule II to the Transportation of Dangerous Goods Regulations. Emergency information on chemicals is organized by UN/NA numbers in the Emergency Response Guide for Dangerous Goods issued by CANUTEC, the Canadian Transport Emergency Centre.

c) Product Use

This section specifies the product use(s) intended by the manufacturer or supplier. Uses other than those intended may pose a risk to workers. For example, a solvent meant for use in degreasing tanks may pose a significant risk to workers if used as a manual cleaning agent because of a tendency to evaporate easily into air.

In some cases, items of information such as "Engineering Controls", "Handling Procedures and Equipment", etc. which appear in Section 7 of the data sheet, Preventive Measures, will be based in part on product use.

d) Manufacturer Identifier: Name, Address and Emergency Telephone Number

This includes the name of the manufacturer and location of the principal place of business.

When the manufacturer has places of business both in Canada and abroad, the address for the Canadian location is provided. If the supplier imports the product from a manufacturer with no place of business in Canada the principal foreign place of business is provided.

Where a supplier imports a controlled product for his own use, the supplier is not required to disclose the name and particulars of the manufacturer.

Where a controlled product is packaged for a distributor by a manufacturer, the manufacturer is not required to disclose the name and particulars of the manufacturer if the supplier identifier and particulars of the distributor are disclosed.

Manufacturer emergency telephone numbers should be selected so as to be operational for at least three years from the date of production of the data sheet, on a 24-hour basis, and should be checked at intervals to ensure proper operation.

The data sheet must be updated when the emergency telephone number or other manufacturer identifiers are changed.

e) Supplier Identifier: Name, Address and Emergency Telephone Number

If the supplier is also the manufacturer, the manufacturer identifier data can be duplicated here, otherwise the supplier identifier will be distinct.

Where a controlled product is sold to a distributor for the purpose of sale or resale, the distributor is not required to disclose the supplier identifier and particulars of the distributor if the supplier identifier and particulars of the manufacturer are disclosed.

A distributor who purchases a controlled product from another supplier is not required to add to the data sheet any particulars of the distributor as a supplier. A distributor may, however, add distributor identifier information as long as it does not obscure supplier information required on the data sheet or create confusion with it.

The supplier emergency telephone number should be selected so as to be operational for three years from the date of production of the data sheet, on a 24-hour basis, and should be test checked at intervals to ensure proper operation.

The data sheet must be updated when the emergency telephone number or other supplier identifiers are changed.

Optional Information Items

Five items of information not required by the *Controlled Products Regulations* in this section of the data sheet, but which the supplier or employer may wish to include, are technical chemical name, chemical family, chemical formula, molecular weight and synonyms.

i) Technical Chemical Name

The technical name of the chemical where the product is a single chemical substance or where the chemical is a primary active ingredient.

The technical name should be in accordance with the nomenclature of the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS), or be a name which clearly identifies the chemical.

One purpose of this information is to provide a technically accurate name to permit a comprehensive search of scientific literature. For example, in the plastics and fibreglassing industries, the product commonly called styrene has the IUPAC name phenylethene.

NOTE: The technical chemical name may appear in other areas of the data sheet as a means of providing required information at those locations; for example, as the product identifier or, more commonly, as a means of identifying hazardous ingredients.

ii) Chemical Family to which the chemical identified in category (i) belongs. A chemical family is a group of chemicals which have similar component(s) to their structure and which, as a result, have somewhat similar chemical properties.

Examples include: acids, caustics, hydrocarbons, aldehydes, ketones, amines, etc.

A knowledge of chemical family can assist with an understanding of the patterns of chemical reactions, health effects on humans, antidotes for poisoning or decomposition products.

For example, the solvent acetone belongs to the ketone family. Ketones are highly reactive, flammable chemicals which have similar effects on humans including irritation of the eye, nose and throat, and, in high concentrations, narcosis.

iii) Chemical Formula of the chemical identified in category (i). A chemical formula shows the relative numbers of atoms of different elements that make up a molecule of the compound.

For example, the chemical formula for the solvent, 1,1,1-trichloroethane is CH_3CCl_3. Chemical formulae assist with an understanding of the make-up of the chemical and the nature of its reactions. The chemical formula of this solvent helps us predict that it will form the irritant products hydrochloric acid and phosgene on decomposition in heat.

iv) Molecular Weight

The molecular weight of a chemical is calculated by adding the atomic weights of all the elements that make up the molecule.

For gases and vapours, if the molecular weight exceeds 29 (the equivalent weight of air), the concentrated gas or vapour is likely to sink on initial release in air; if less than 29, rise.

NOTE**: Normally, gases and vapours will eventually disperse evenly in air, irrespective of molecular weight.**

For example, one molecule of chlorine gas contains two atoms of chlorine each of which has an atomic weight of 35.48. The molecular weight of chlorine gas is 70.96, substantially heavier than air.

v) Synonyms

These terms, where different from the product identifier or chemical name, will assist with the search for the hazard properties of the product. For example, the dry-cleaning solvent, tetrachloroethylene, has the synonyms perchloroethylene, perc, carbon dichloride and ethylene tetrachloride.

2. Section 2: Hazardous Ingredients

SECTION 2 — HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	%	CAS NUMBER	LD_{50} OF INGREDIENT (SPECIFY SPECIES AND ROUTE)	LC_{50} OF INGREDIENT (SPECIFY SPECIES)

This section provides information on the identity, concentration and estimators of acute toxicity for ingredients in a controlled product.

a) Chemical Identity and Concentrations of Ingredients

Sections 13(a) and 14(a) of the Hazardous Products Act require that the chemical identity of a pure substance, or the identity and concentration of any ingredient in a controlled product which is a mixture, be disclosed if the pure substance or ingredient:

i) is a controlled product;

ii) is included in the Ingredient Disclosure List and is in a concentration equal to or more than the concentration specified on the list;

iii) is one which the supplier has reasonable grounds to believe may be harmful to any person; or

iv) is one for which the toxicological properties are not known to the supplier.

Section 4 of the *Controlled Products Regulations* exempts controlled products (other than a complex mixture or an ingredient of a controlled product that is a complex mixture) from the application of Sections 13(a) and 14(a) of HPA if:

i) the ingredient is in a concentration less than 1/10 of one per cent by weight (0.1 per cent) where the ingredient is classified within Subdivision A, Very Toxic Material, of Division 2 of Class D as a:

- carcinogen;

- reproductive toxin;
- respiratory tract sensitizer;
- teratogen;
- embryotoxin; or
- mutagen;

as defined in Sections 53-57 of the *Controlled Products Regulations*; or

ii) the ingredient is less than one per cent by weight for any other ingredient, unless it is included in the Ingredient Disclosure List and the concentration for that ingredient is 0.1 per cent. Appendix A to this Chapter provides the Ingredient Disclosure List issued 31 December 1987.

Requirements to disclose ingredients may be waived in three other specific circumstances:

i) a controlled product is (or contains) a naturally occurring "complex mixture" such as turpentine, in which case it is not necessary to disclose the identity and concentration of the ingredients in the mixture if the generic name of the mixture and its concentration are disclosed;*

ii) a lab sample is sold or imported solely to be tested for research and development, and the generic chemical identity of the ingredients are disclosed on the MSDS; or

iii) an exemption has been granted pursuant to the Hazardous Materials Information Review Act.

When ingredients are not always present in the controlled product in the same concentrations, percentage disclosure ranges can be used as follows:

0.1 - 1%
0.5 - 1.5%
1 - 5%
3 - 7%
5 - 10%
7 - 13%
10 - 30%
15 - 40%
30 - 60%
40 - 70%
60 - 100%

Ranges other than those listed may be used as long as both the upper and lower limits fall within any one of the specified ranges.

*** A complex mixture is a combination of many chemicals with a commonly known generic name that is either naturally occurring, a fraction of a naturally occurring mixture that results from a separation process or is a modification of such a mixture or fraction. An example is turpentine.**

Percentage concentrations and concentration ranges reported on the data sheet must be an expression of the ratio of:

- the weight of the ingredient or complex mixture to the weight of the controlled product;
- the volume of the ingredient or complex mixture to the volume of the controlled product; or
- the weight of the ingredient or complex mixture to the volume of the controlled product.

The material safety data sheet must disclose which ratio is being used -- weight/weight, volume/volume, weight/volume.

NB: While concentrations (and concentration ranges) in the list of hazardous ingredients reported on the data sheet may be expressed in any one of the three ratios, the concentration cutoffs of 1% and 0.1% used to determine whether or not an ingredient must be listed are based solely on a weight/weight ratio.

b) CAS Number Registry numbers are assigned to chemical substances by the Chemical Abstracts Service Division of the American Chemical Society. For those chemicals on the Ingredient Disclosure List, the CAS number is given in column II of the list.

c) LD_{50} of the Ingredients

A measure of acute lethality which means, in a laboratory animal study, the single dose of a substance expressed as the weight of a substance per unit weight of the body of the test animal which is expected to cause the death of 50 per cent of an animal population (e.g. rats, rabbits, mice) when administered by a defined route (either oral or dermal). Lethal effects vary for both species and route.

Where the product is a mixture and the LD_{50} is determined by testing the mixture, the supplier must disclose that LD_{50} in place of the LD_{50}'s of the ingredients of the mixture. (Reference: CPR, Section 12[10]).

The LD_{50} is only an indicator of acute toxicity with non-human mammals. It must be interpreted carefully in relation to the likelihood of human acute health effect and must never be considered an indicator of the likelihood of chronic effects.

d) LC50 of the Ingredients

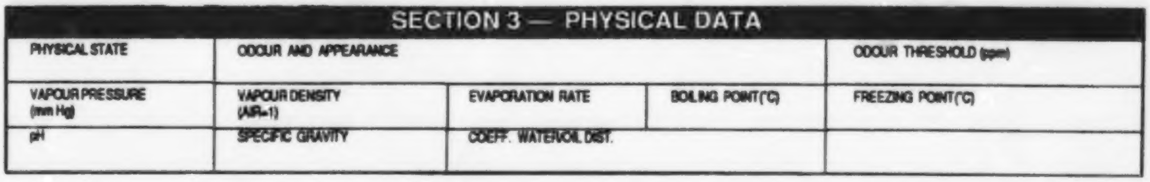
A measure of acute lethality and means, in a laboratory animal study, the concentration of a substance in air or other medium which, administered over a specified period of time, is expected to cause the death of 50 per cent of a defined animal population. LC_{50}'s in WHMIS are based on four-hour exposure periods. Where test data are not available for four-hour periods, LC_{50}'s may be determined from other periods of exposure adjusted to a four-hour equivalent by application of the formula reported on page 2-24 of this Manual. (Reference: CPR, Section 44) As with LD_{50}'s, lethal effects vary by species.

Where the product is a mixture and the LC_{50} is determined by testing the mixture, the supplier must disclose that LC_{50} in place of LC_{50}'s of the ingredients of the mixture. (Reference: CPR, Section 12[10]).

The LC50 is only an indicator of acute toxicity for non-human mammals. It must be interpreted carefully in relation to the likelihood of human acute health effect, and must never be considered an indicator of the likelihood of chronic effects.

NOTE: LC_{50}'s must never be confused with Exposure Limits! LC_{50}'s are an extreme indicator of potential for acute effect -- i.e. death. Exposure limits are far lower and are considered levels to which most workers can be exposed day after day without likelihood of adverse effect.

3. Section 3: Physical Data



SECTION 3 — PHYSICAL DATA

PHYSICAL STATE	ODOUR AND APPEARANCE			ODOUR THRESHOLD (ppm)
VAPOUR PRESSURE (mm Hg)	VAPOUR DENSITY (AIR=1)	EVAPORATION RATE	BOILING POINT(°C)	FREEZING POINT(°C)
pH	SPECIFIC GRAVITY	COEFF. WATER/OIL DIST.		

This section provides a physical description of the product which is useful for recognition of presence, an understanding of its response to change in the physical environment, and has specific applications for ventilation system design and emergency procedures.

a) Physical State

The physical state of the product, as a gas, liquid or solid at room temperature. Physical state is important in understanding the difficulty of containing the product and helps predict the response of the product to changes in temperature and pressure.

b) Odour and Appearance

The quality of odour (e.g. almond-like, fruity, sharp, sweet), its intensity (e.g. strong, weak, mild, faint) and irritant properties are recorded here rather than odour acceptability (pleasant, unpleasant). The Harper List of Terms for Scaling Odour Quality, which contains 44 odour categories, may be used for descriptions.

Appearance refers to characteristics such as colour (including colourless), surface texture (e.g. greasy, waxy, soft) and degree of aggregation (e.g. finely divided particulate, flakes, granules). Liquids can be described by their viscosity (e.g. as being gelatinous, viscous, thick or thin).

c) Odour Threshold

The lowest airborne concentration of a chemical in air that can be perceived by the sense of smell. Normally expressed as ppm or per cent but may also be expressed in mg/m^3.

Odour threshold may be useful in evaluating the product's warning properties, which can be rated roughly as follows:

Warning Properties	Odour Threshold Level
Good	Odour threshold is less than 1/10 of exposure limit.
Fair	Odour threshold is between 1/10 of exposure limit and three times above it (and the exposure limit is not a ceiling limit, nor could exposure up to three times the limit cause serious or irreversible health effects).
Poor	Odour threshold is three times or more above exposure limit.

For example, methyl bromide which has an odour threshold in the range of 80 mg/m^3-4,000 mg/m^3 and a TLV of 20 mg/m^3 (ACGIH) has poor warning properties; methyl methacrylate with an odour threshold in the range of 0.2-1.4 mg/m^3 and a TLV of 410 mg/m^3 (ACGIH) has good warning properties.

However, odour thresholds must be used with caution when evaluating warning properties because individual sensitivities to odour vary; the human response to odour is not proportional to odourant concentration, and some odourants (e.g. hydrogen sulphide) may de-sensitize the sense of smell. This is called olfactory fatigue.

Properly used, odour thresholds provide information to consider when selecting respiratory protection.

d) Vapour Pressure

The pressure exerted by a saturated vapour above a liquid or volatile solid in a closed container at 20°C (unless a different temperature is specified). Measured in millimetres of mercury (mmHg). One atmosphere equals 760 mmHg pressure. (1 mmHg pressure is also called a "torr".)

Vapour pressures are one measure of the ability of substances to form vapours. Materials with high vapour pressures can be hazardous, particularly in enclosed, unventilated areas. Solids (e.g. iodine) as well as liquids may have significant vapour pressures.

A rough measure of the concentration (in ppm) of the vapour in air in saturated conditions at normal temperature and pressure is given by the formula:

$$\frac{\text{Vapour Pressure (mmHg)} \times 10^6}{760 \text{ (mmHg)}}$$

e) Vapour Density

Refers to the weight of a given volume of a vapour or gas compared to the weight of an equal volume of air. Vapour density = the molecular weight of the gas or vapour divided by 29 (the equivalent weight of air). Products lighter than air have vapour densities less than one (e.g. helium, methane); those heavier than air have densities more than one (e.g. chlorine, carbon dioxide). The tendency of gases to rise or fall in air depends not only on density but also temperature, air turbulence and time. In normal circumstances a gas released into air will eventually mix evenly with it.

Vapour density can help determine air testing strategies and ventilation procedures.

f) Evaporation Rate

The rate at which a particular material will vapourize (evaporate) in air relative to butyl acetate, ether or other specified solvent. Because ether evaporates quickly compared to butyl acetate, the chemical used for comparison must be listed. Evaporation rates are useful for estimating the rate of onset of vapour hazard when a liquid or mist aerosol is exposed to air. This may have implications for health and fire hazard potential.

Compared to normal butyl acetate -- NBuAc (which is assigned a rate of 1.0) vapourization rates can be classified as:

- FAST evaporating if greater than 3.0.
  Examples: Methyl Ethyl Ketone (MEK) = 3.8 hexane = 8.3.
- MEDIUM evaporating if 0.8 to 3.0.
  Examples: (95%) Ethyl Alcohol - 1.4, MIBK - 1.6.
- SLOW evaporating if less than 0.8.
  Examples: Xylene = 0.6, Mineral Spirits = 0.1.

g) Boiling Point

The temperature at which a liquid becomes a gas. Ranges are given for mixtures. Boiling points are determined at 760 mm pressure unless otherwise indicated and are significant because of the sudden volume change of the product and the extent of its presence in air. Care must be taken to keep stored liquids below their boiling points.

h) Freezing Point

The temperature at which solid and liquid phases of a product are in equilibrium at 760 mm pressure. Volume changes may occur at the freezing point which may rupture containers. Fluids are more difficult to contain than solids.

i) pH

A numerical expression on a scale from 0 to 14 of the extent of acidity or alkalinity of a product, where 7 represents neutrality. pH values lower than 7 represent acidity (pH 0 - 3, high acidity); and greater than 7, alkalinity (pH, 11 - 14, high alkalinity). The pH scale is logarithmic and one pH unit represents a factor of 10. pH is one predictor of corrosive qualities of a product.

j) Specific Gravity

The ratio of the weight of a volume of the product to the weight of an equal volume of water at a specified temperature. If an insoluble product has a specific gravity more than one it will sink in water; less than one, float. Specific gravity is an expression of the density of material.

k) Coefficient of Water/Oil Distribution

The ratio of a product's distribution between "oil" and water when they are in contact. (In technical terms, it is called the "water-octanol partition coefficient" because the lab test to determine the coefficient is done with n-octanol.)

A value of less than 1 indicates better solubility of the substance in oils and greases. Such a product may be likely to be absorbed by the skin. A value greater than 1 indicates a better solubility in water. This type of product could be absorbed by mucosal tissue of the eyes or lungs. This information can be useful when assessing first aid requirements, and selecting personal protective equipment.

The coefficient may also help with the general understanding of the affinity of the product for fatty tissue (called lipophilic properties) and the development of clean-up procedures in event of contamination of a water body.

Optional Information Items

Two items of information not required by the *Controlled Products Regulations* but which the supplier or employer may want to include on the data sheet are: per cent volatile and solubility in water. A blank space is provided on the model data sheet (page 4-20) for optional use.

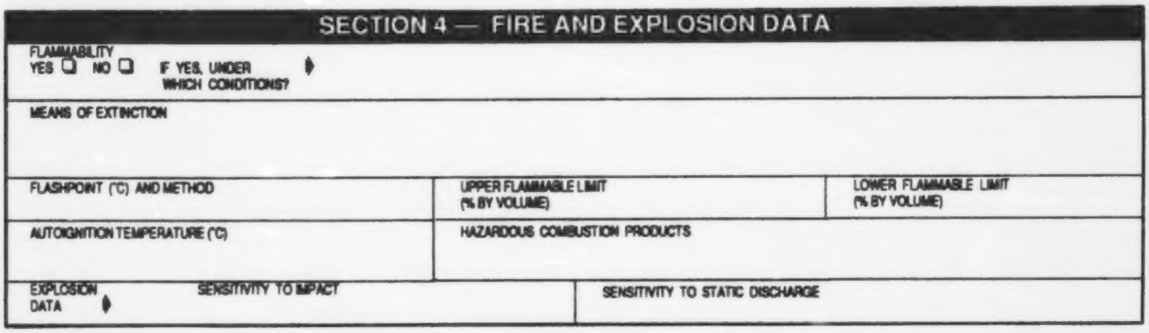
i) Per cent Volatile (By Volume)

The percentage of a liquid or solid (by volume) that will evaporate at ambient temperature. For example, butane is 100% volatile.

ii) Solubility in Water (20°C)

The percentage concentration of material by weight in a saturated water solution at 20°C. Less than 0.1% is considered NEGLIGIBLE; 0.1 - 1% is SLIGHT; 1 - 10% is MODERATE; more than 10% is APPRECIABLE. Solubility has implications for preventive measures that range from personal hygiene practices to spill clean-up procedures. Water soluble materials are easily absorbed by the mucous membranes of the nose and throat.

4. Section 4: Fire and Explosion Data



SECTION 4 — FIRE AND EXPLOSION DATA

FLAMMABILITY
YES ☐ NO ☐ IF YES, UNDER WHICH CONDITIONS? ▶

MEANS OF EXTINCTION

FLASHPOINT (°C) AND METHOD
UPPER FLAMMABLE LIMIT (% BY VOLUME)
LOWER FLAMMABLE LIMIT (% BY VOLUME)

AUTOIGNITION TEMPERATURE (°C)
HAZARDOUS COMBUSTION PRODUCTS

EXPLOSION DATA ▶
SENSITIVITY TO IMPACT
SENSITIVITY TO STATIC DISCHARGE

The intent of Section 4 is to provide information to assist with fire and explosion prevention, and procedures in the event of emergency. This section is particularly important with flammables, solvents, organic peroxides, explosives, metal dusts and other unstable substances. If the product is not flammable or explosive, information in this section must reflect that fact.

a) Flammability

Under WHMIS legislation, Flammable and Combustible Materials are grouped in Class B. Six Divisions are provided within the Class. Check the box "YES" on the MSDS if the product belongs in Class B and, if "YES", identify the Division and describe conditions under which ignition could occur.

Divisions are summarized on page 4-42. For a more complete description of the criteria for defining the Divisions, refer to Chapter 2 of this Manual.

b) Means of Extinction

A list of extinguishers suitable for use on the burning product. Extinguishers can be rated as A, B, C, D respectively if they are intended for fires of ordinary solid combustibles, flammable liquids, electrical equipment or combustible metals. Standard firefighting agents include water, water fog, foam, alcohol foam, carbon dioxide and dry chemical. For some chemicals, special materials are available.

DIVISIONS WITHIN CLASS B

1. Flammable Gases

Compressed gases which form flammable mixtures in air either:
- at a concentration of 13% or less by volume; or
- over a concentration range greater than 12% by volume.

2. Flammable Liquids

Liquid products with a flashpoint less than 37.8°C (100°F).

3. Combustible Liquids

Liquid products having a flashpoint of 37.8°C (100°F) or greater, but less than 93.3°C (200°F).

4. Flammable Solids

Solids which are:
- liable to cause fire through friction or through heat retained from manufacturing or processing; or
- which can be ignited readily and burn so vigorously and persistently as to create a hazard; or
- which ignite and burn with a self-sustained flame at a rate greater than 0.254 cm (0.1 inches) per second.

5. Flammable Aerosols

Any product packaged in an aerosol container which produces a flame projection at full valve opening or a flashback at any degree of valve opening when tested according to the method in Schedule VI to the *Controlled Products Regulations*.

6. Reactive Flammable Materials

Any product which is spontaneously combustible and liable to spontaneous heating in normal use; or is liable to heat in contact with air to the point where it begins to burn; or is dangerous when wet and emits dangerous quantities of flammable gas; or becomes spontaneously combustible on contact with water or water vapour.

This information topic will include, where necessary, special procedures to follow during firefighting because of unusual hazards of the product.

For example, calcium carbide, some reactive metals and concentrated corrosives react dangerously with water. Compressed gas cylinders may explode in a fire unless cooled. A fine water spray may be necessary to prevent breakage or rupturing of some containers.

Precautions may include personal protective equipment, particularly respiratory protection, special firefighting procedures, etc.

c) Flashpoint (°C) and Method

The minimum temperature, under specified test circumstances, at which a liquid product gives off enough vapour to ignite in the presence of a source of ignition such as an open flame or spark.

Flashpoints have been determined in both enclosed test systems (termed "closed-cup") and non-enclosed (termed "open-cup"). Flashpoints determined by closed-cup methods tend to be lower than by open-cup.

The *Controlled Products Regulations* prescribe the choice of one of four closed-cup methods for flashpoint determination depending on the viscosity of the product and its use as a paint coating.

For a given test method, the lower the flashpoint of material the greater the hazard of vapour ignition.

d) Flammable Limits in Air (Upper Flammable Limit [UFL] and Lower Flammable Limit [LFL])

These are the upper (maximum) and lower (minimum) concentrations of a gas or vapour in air between which an explosion or propagation of flame will occur when an ignition source is present. Flammable limits are sometimes termed "Explosive Limits".

Limits are expressed in per cent by volume of the gas or vapour in air. Above the UFL, the mixture is too rich to burn; below the LFL, too lean. Both the flammable limits and the range of flammability (the UFL minus the LFL) are important factors to consider when evaluating and controlling fire hazard. The LFL can be used to determine the dilution ventilation required to reduce an explosive atmosphere to a level below the flammable range. If an atmosphere is above the flammable range, the UFL indicates the level below which the atmosphere will become explosive.

e) Auto-ignition Temperature

The lowest temperature at which a vapour or gas will ignite, in the absence of a spark or flame. This is an important factor in areas where gases or vapours may be exposed to high temperatures or hot surfaces.

f) Hazardous Combustion Products

Hazardous products likely to be produced during combustion of the product are identified. Examples of such products include carbon monoxide, hydrogen cyanide or other *chemical asphyxiants*; various acid gases, aldehydes etc. which have *irritant or corrosive properties*; and *toxic monomers* released from the decomposition of plastics.

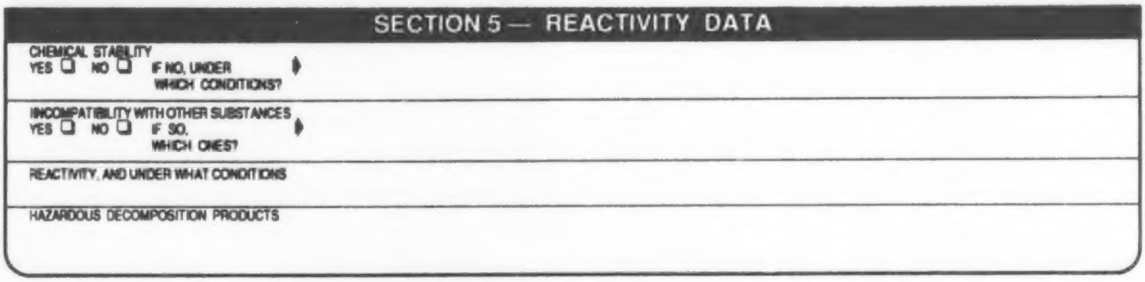
g) Explosion Data: Sensitivity to Impact

A description of the likelihood the product may explode as a result of mechanical impact caused, for example, by jarring during transport. Chemicals such as metal azides and acetylides are sensitive to physical shock.

h) Explosion Data: Sensitivity to Static Discharge

Vapours, gases and dusts vary in the ease of ignition when exposed to static discharge. For example, under optimum conditions the static energy required to ignite some saturated hydrocarbon vapours is about 0.25 millijoules; for hydrogen in air as little as .017 millijoules is required.

5. Section 5: Reactivity Data



SECTION 5 — REACTIVITY DATA

CHEMICAL STABILITY
YES ☐ NO ☐ IF NO, UNDER WHICH CONDITIONS? ▶

INCOMPATIBILITY WITH OTHER SUBSTANCES
YES ☐ NO ☐ IF SO, WHICH ONES? ▶

REACTIVITY, AND UNDER WHAT CONDITIONS

HAZARDOUS DECOMPOSITION PRODUCTS

The intent of this section is to provide information on the stability of the product and its likelihood of dangerous reaction with other chemicals. Information here has implications for handling procedures, storage arrangements and may be useful along with Section 4 data for the prevention and control of fires or explosions.

a) Chemical Stability

A chemical is unstable if, in the pure state, or as produced or transported, it will vigorously polymerize, decompose, condense, or become self-reactive under physical conditions of shock, vibration, pressure, or temperature.

Some peroxides, azides and various explosives are chemically unstable. It is essential to store and handle such materials to avoid the physical conditions which cause adverse reactions.

b) Incompatibility

Two substances are incompatible if, on combination, they react dangerously and produce toxic or corrosive by-products, excessive heat or explosion.

For example, strong mineral acids are incompatible with caustics; sodium is incompatible with water; flammable substances are incompatible with oxidizers.

Incompatible substances must be handled and stored to minimize the likelihood of contact with each other.

c) Reactivity

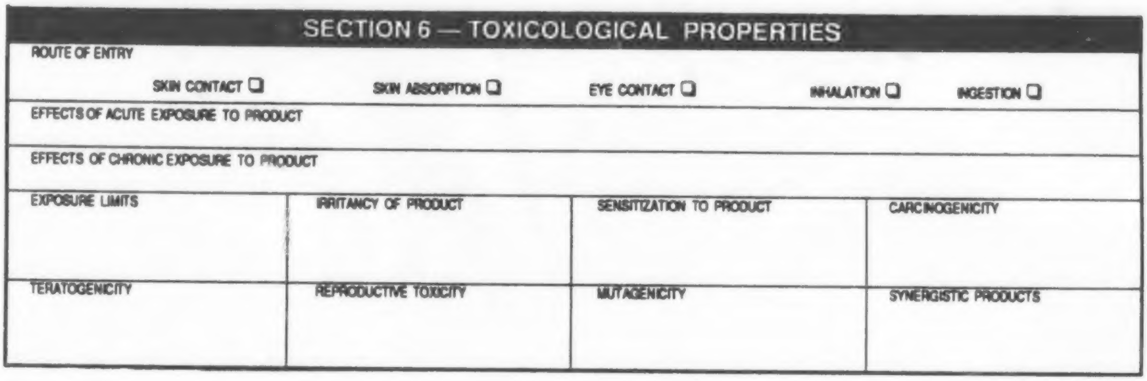
This category provides a location to include information on reactivity other than that provided in categories (a) and (b), and to specify the conditions under which it can occur. For example, a monomeric product which is chemically stable in the presence of an inhibitor may violently polymerize if inhibitor content is reduced. Such a reaction could cause a container to break and residual product to be spilled.

d) Hazardous Decomposition Products

This category must list dangerous products released if the substance is exposed to aging, heating, burning, oxidation or is allowed to react. Examples include the formation of peroxides with aging of various ethers and unsaturated cyclic compounds, and the formation of products such as chemical asphyxiants, and irritant gases on combustion of some materials.

Where aging is a factor, shelf life and product test information should be provided where applicable in Section 7, "Preventive Measures".

6. Section 6: Toxicological Properties



SECTION 6 — TOXICOLOGICAL PROPERTIES

ROUTE OF ENTRY

SKIN CONTACT ☐ SKIN ABSORPTION ☐ EYE CONTACT ☐ INHALATION ☐ INGESTION ☐

EFFECTS OF ACUTE EXPOSURE TO PRODUCT

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT

EXPOSURE LIMITS	IRRITANCY OF PRODUCT	SENSITIZATION TO PRODUCT	CARCINOGENICITY
TERATOGENICITY	REPRODUCTIVE TOXICITY	MUTAGENICITY	SYNERGISTIC PRODUCTS

This section provides information on how a material is likely to enter the body and what short- and long-term health effects it is likely to have on an exposed worker, including signs and symptoms of exposure and pre-existing medical conditions which may be aggravated. Information in this section is an important determinant of preventive and first aid measures in Sections 7 and 8. **NOTE: Where data on the toxicological properties of a controlled product provided on one part of the MSDS may be interpreted to qualify or contradict other toxicological data on the sheet, the MSDS must include sufficient particulars of toxicological studies so as not to mislead a person about the nature and extent of the hazard posed by the controlled product.**

a) Route of Entry

Indicate all primary routes of entry or areas of localized effect on the surface of the body.

Some chemicals are capable of causing dermal effects on the skin, eyes or mucosal surfaces. For example, many corrosives will cause localized skin or eye irritation or burn, and should be designated SKIN CONTACT and EYE CONTACT respectively.

Products which contribute to the overall exposure of a worker by absorption through the skin, including mucosal membranes are designated SKIN ABSORPTION. The American Conference of Governmental Industrial Hygienists, in its annual publication, Threshold Limit Values and Biological Exposure Indices, identifies chemicals with significant skin absorption properties with the notation SKIN. Many phenols, amines, alkyl lead compounds and pesticides belong in this category.

If the product, as manufactured or under conditions of use, is likely to exist in an airborne state such as a fume, dust, fibre, mist, vapour, or gas, then INHALATION will be one route of entry. For example, liquids with high vapour pressures and rates of evaporation will often pose inhalation hazards.

Effects due to inhalation may result from short-term (acute) exposure (e.g. hydrogen sulphide), or long-term (chronic) exposure (e.g. free silica), or both (e.g. toluene diisocyanate).

Include INGESTION as a route if a product is likely to cause adverse health effects by swallowing; for example, by transfer from contaminated fingers to the mouth during eating or drinking activity.

Routes of entry are important from a preventive viewpoint. Inhalation hazards often require air contaminant controls such as ventilation or, as a last resort, respiratory protection; dermal hazards, skin protection and ingestion hazards, personal hygiene and other measures.

b) Effects of Acute Exposure to Material

These refer to adverse health effects resulting from short-term exposure to the material, either as a single exposure or multiple exposures occurring within a short time, usually 24 hours or less.

For example, an acute exposure to the chemical asphyxiant carbon monoxide can, depending on the dose, induce symptoms ranging from headache and dizziness to coma and death. In contrast, an acute exposure to a product such as free silica may be unlikely to induce either short- or long-term health effects.

Immediate symptoms of acute exposure are important data for first aid procedures in Section 8 of the data sheet.

c) Effects of Chronic Exposure to Material

These refer to health effects resulting from repeated exposure to the substance over a relatively long period of time or from a single exposure with symptoms that develop over a long period of time, or that recur frequently. For example, recurrent exposure to low levels of carbon monoxide may initiate or enhance heart problems particularly in individuals with predisposing conditions of heart disease.

Repeated exposure to free silica in air may cause the lung disease, silicosis.

d) Exposure Limits

These are the maximum limits of exposure to an airborne substance as recommended by bodies such as the ACGIH, NIOSH or as legislated by a health and safety regulatory agency. Exposure limits generally represent conditions in which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect.

Because exposure limits may vary from one jurisdiction to another, it is appropriate for suppliers to specify the agency responsible for the limit used on the supplier data sheet and to include a statement advising employers to check with the local regulatory agency for the limit in effect in their area. It is recommended that employer-produced data sheets provide the exposure limit adopted by the local regulatory agency.

There are three types of limits in common use:

i) Exposure Limit - TWA

The time-weighted average concentration for a normal 8-hour work-day or 40-hour work-week to which nearly all workers can be repeatedly exposed without adverse effect.

ii) Exposure Limit - STEL

The short-term exposure limit, i.e. the maximum concentration to which workers can be periodically exposed for a period up to 15 minutes without suffering from irritation, chronic or irreversible tissue change, or narcosis of sufficient degree to increase risk of accidental injury, or impair ability for self-rescue.

iii) Exposure Limit - C

The ceiling concentration of an airborne substance that must not be exceeded at any time. This limit is applied to substances that are primarily irritant or fast-acting and for which the TWA is inappropriate.

The data sheet should indicate which type of limit is specified.

Where a product is a mixture, the supplier may wish to provide exposure limits, where they exist, for ingredients; particularly for the major ingredient(s) in the mixture and those which have the lowest exposure limits.

Exposure limits not only represent maximum conditions of exposure which are believed to be safe for most workers, but also, when evaluated in relation to odour thresholds (see Section 3 of the data sheet), they provide an estimate of the warning properties of the material.

e) Irritancy of Product

Provide information here on the primary irritant qualities of the material, i.e. its capability to cause localized effects such as irritation, erythema, burn or swelling at the site of contact on the skin, eyes, or mucosal areas. Chemical families which generally exhibit primary irritant qualities include acids, caustics, amines and ketones.

Information in this subsection is important when selecting skin and eye protective measures, and emergency wash facilities.

f) Sensitizing Capability of Product

A sensitizer is a substance which on first exposure likely causes little or no reaction in persons or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization is also known.

Isocyanates are an example of a family of sensitizers.

Dermal and respiratory protective controls must be included as appropriate to prevent sensitization of workers who handle such products.

g) Carcinogenicity

This subsection describes the cancer-causing properties of the product. Under the *Controlled Products Regulations*, acceptable evidence of the carcinogenicity of a pure substance or mixture is its inclusion in:

- Sections A1 or A2 of Appendix A of Threshold Limit Values and Biological Exposure Indices as published by the ACGIH and amended periodically; or

- if listed in Groups 1 or 2 in the IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans as published periodically by the International Agency for Research on Cancer.

Information in this subsection may indicate, consistent with descriptors in each publication, the status of evidence, e.g. "recognized carcinogen", "suspect carcinogen", "probably carcinogenic", "limited evidence of carcinogenicity", etc. If one agency ranks a product higher in carcinogenic potential than the other agency, it is inappropriate not to report the higher ranking. See Chapter 2 for further information.

Products other than those listed in the two publications must also be included where there is sufficient evidence to warrant it. Agencies such as the Canadian Centre for Occupational Health and Safety may be able to assist with the determination.

Effective control procedures must be implemented to minimize the risk of exposure to carcinogens. In some cases no exposure may be permitted.

h) Teratogenicity and Embryotoxicity

The capability of a product to produce injuries in offspring resulting from exposure of the pregnant female to the product at a concentration that has no adverse effect on the female. Injuries include death, malformation, permanent metabolic or physiological dysfunction, growth retardation, or psychological or behavioural alteration that occurs during pregnancy, at birth or in the postnatal period. The embryonic stage of development of the fetus from two to eight weeks is particularly at risk of injury to such products. Thalidomide is an example of a teratogen.

i) Reproductive Toxicity

Substances which cause reproductive toxicity (i.e. sterility or adverse effect on reproductive capability) are included in Class D. Reproductive toxicity has implications for the capability to produce offspring as well as for teratogenicity and embryotoxicity.

j) Mutagenicity

The capability of a product to cause mutations in the genetic material of living cells. Changes to reproductive (germ) cells may result in heritable genetic effects. Changes to non-reproductive (body) cells may be associated with increased risk of other effects such as cancer. Males or females of a species may be at risk of adverse effect upon exposure to a product which is mutagenic to the species.

k) Synergistic Materials

Include any material here which interacts with the controlled product to produce a toxic effect greater than the sum of effects of the material and the controlled product acting separately.

For example, historically it has been found in the mining industry that exposure to free silica and the bacteria *Mycobacterium tuberculosis* produced a far greater incidence of tuberculosis than from exposure to the bacteria alone.

More recently, exposure to asbestos and cigarette smoke has been shown to produce a risk of lung cancer far greater than the sum of risks for exposure to each agent alone.

Optional Information Items

Two items of information not required on the MSDS but which the employer may wish to provide here are the LD_{50} and LC_{50} for the product as a whole where the product is a mixture, and for which lethality tests have not been carried out on the mixture, but an estimate of lethality of the mixture can be based, under CPR, on the lethality of ingredients.

NOTE: Where a product is a mixture and a laboratory determination of the LD_{50} or LC_{50} of the whole mixture has been made, that figure must be reported on the data sheet; i.e. it is not optional.

i) LD50 of the Product

A measure of acute lethality and refers to the single dose of the substance which is expected to cause the death of 50 per cent of a defined animal population in a laboratory study.

If the LD_{50} of the mixture as a whole has not been determined by testing then the mixture's LD_{50} is determined as follows, based on components present in the mixture in proportions of one per cent or more:

- if the acute lethalities are known for all such components, the LD_{50} for the mixture is the sum of those lethalities, as determined by the formula as shown on page 2-28 of this Manual; or

- where the acute lethalities are not known for all such components, the acute lethality of the mixture is that of the most acutely lethal component.

It is essential to specify the route of exposure (oral or dermal) and species of animal (e.g. rat, mouse, rabbit) because lethal effects vary with each. Determination of the acute lethality of a mixture by addition of lethalities of ingredients must be based on the same route of exposure and, where possible, one animal species.

ii) LC50 of the Product

A measure of acute lethality and refers to the concentration of the substance in air which, administered for a specified period by means of inhalation in air, is expected to cause the death of 50 per cent of a defined animal population.

LC_{50}'s in WHMIS are based on four-hour exposures. LC_{50}'s determined in other exposure periods are adjusted to four hours by the formula given in Section 44 of CPR. (See page 2-26 of this Manual.)

If the LC_{50} of the mixture as a whole has not been determined by testing, then the mixture's LC_{50} is determined as follows, based on components present in the mixture in proportions of one per cent or more:

- if the acute lethalities are known for all such components, the LC_{50} for the mixture is the sum of those lethalities, as determined by the formula as shown on page 2-28 of this Manual; or
- where the acute lethalities are not known for all such components, the acute lethality of the mixture is that of the most acutely lethal component.

It is essential to specify animal species as lethality will vary from one species to the next. The additive determination of acute lethality of a mixture based on the lethality of its components should be based on one animal species.

7. Section 7: Preventive Measures

SECTION 7— PREVENTIVE MEASURES		
PERSONAL PROTECTIVE EQUIPMENT:		
GLOVES (SPECIFY)	RESPIRATOR (SPECIFY)	EYE (SPECIFY)
FOOTWEAR (SPECIFY	CLOTHING (SPECIFY)	OTHER (SPECIFY)
ENGINEERING CONTROLS (SPECIFY, EG. VENTILATION, ENCLOSED PROCESS.)		
LEAK AND SPILL PROCEDURE		
WASTE DISPOSAL		
HANDLING PROCEDURES AND EQUIPMENT		
STORAGE REQUIREMENTS		
SPECIAL SHIPPING INFORMATION		

The intent of the section is to provide, on the basis of information in Sections 1-6, clear direction for the provision of measures to protect worker health and safety during the transportation, storage, use and disposal of the product, as well as emergency procedures related to accidental release. Information must be as specific as possible to ensure proper implementation of workplace health and safety programs. Employers must adapt information from data sheets to the specific hazard circumstances of each workplace.

a) Personal Protective Equipment

- Gloves - Specify wherever the product is likely to contact the hands and is a primary irritant, sensitizer or capable of absorption through dermal tissue. Provide direction on chemically resistant materials (neoprene, fluorocarbon, PVA, natural rubber, etc.) and, where appropriate, glove design (wrist, gauntlet, etc.).

- Respiratory - Specify wherever the product is likely to constitute an inhalation hazard, in normal circumstances or emergency situations. Selection will be based on nature of the air contaminant, warning properties, irritant qualities and level of exposure. See CSA Standard Z94.4-M1982 "Selection Care and Use of Respirators" for assistance.

Specify as appropriate the type of unit (disposable, cartridge or canister air filtering, PAPR, SCBA, etc.), design of facepiece (half facepiece, full facepiece, etc.), and for air-filtering respirators the type of filter (dust, mist, fume, acid gas, vapour, etc.). Respirators must meet standards of appropriate agencies (e.g. NIOSH, or occupational safety and health jurisdictions).

NOTE: A single respirator is not appropriate for all exposure situations. For example, in IDLH (Immediately Dangerous to Life or Health) conditions, air-filtering respirators must not be used. It is recommended that IDLH levels for a controlled product, if known, be included here.

Example: A controlled product is an acid gas, with eye irritant properties, an exposure limit of 25 ppm and an IDLH level of 300 ppm. An appropriate MSDS statement would be:

> "Use respirator approved by NIOSH/MSHA -- full facepiece with cartridges (acid gas) for exposures up to 10X exposure limit; SCBA or supplied air with egress bottle above 300 ppm or other IDLH conditions."

- Eye - Specify wherever the product is likely to pose a hazard to eyes. Provide information as appropriate on the design (spectacles, eyecup, monogoggle, face shield), lens material, and circumstances of use. See CSA Standard Z94.3-M1982 "Industrial Eye and Face Protectors" for selection information on eyewear.

- Footwear - Specify wherever the product may constitute a hazard to the lower leg and feet due to skin absorption, irritation or sensitization, where the material may cause deterioration of normal footwear, or constitute a slipping hazard. Specify as appropriate the material in the footwear, height on the lower leg, nature of tread.

- Clothing - Specify wherever the chemical may constitute a hazard to workers through skin contact or absorption. Describe, as appropriate, type (e.g. apron, vest, coveralls, chemically resistant suit etc.); material (e.g. neoprene, nylon, PVC, polyurethane, etc.).

- Other - Specify as necessary other protective items such as devices for thermal comfort (e.g. vortex tubes), glove-jacket fastening devices, etc.

b) Engineering Controls

Provide information on recommended engineering controls such as ventilation, process enclosure, process equipment design, etc. Ventilation system information may include: dilution air volumes, preferred air movers, duct velocities, or duct material. Distinguish between local exhaust ventilation and general ventilation.

See Industrial Ventilation: A Manual of Recommended Practice published by the ACGIH for technical information. Table 2-1 "Dilution Air Volumes for Vapours" gives recommended dilution volumes for a number of organic solvents.

NOTE: Engineering controls are usually preferred over the use of personal protective equipment as they control the problem at the source.

c) Leak and Spill Procedure

Safe procedures in event of leak, spill or other release of the substances, including, as appropriate:

- protective equipment for emergency workers;
- neutralizing, adsorbing or other control materials;
- particular safety procedures; for example, a requirement to keep upwind of a leak, to use only vacuum cleaning equipment filled with HEPA filters, etc.

d) Waste Disposal

Provide information, as appropriate, related to:

- waste container design;
- identifiers on containers consistent with WHMIS;
- preferred or required disposal locations;
- safe procedures for handling wastes; e.g. "Do not burn", "Neutralize with (specify)", "Provide charcoal adsorption", etc.;
- agency(ies) to contact regarding disposal requirements. (It is recommended that a warning statement be provided to dispose of wastes in accordance with applicable environmental regulations.)

e) Handling Procedures and Equipment

Describe particular procedures and equipment which are needed for protection against primary and special hazards of the controlled product. Procedures must be consistent with precautionary measures on the product label. For example: with laboratory chemicals, "Never pipette by mouth. Use a bulb pipette or aspirator"; with picric acid, "Do not allow to become dry during storage, handling or use"; with strong corrosives, "Dilute by adding (the product) to water, NOT by adding water to (the product)."

f) Storage Requirements

Provide information essential for safe storage regarding; for example:

- temperature;
- control of sources of ignition;
- separation of incompatible products;
- limits to shelf life;
- testing procedures; for example, for peroxide formation with some ethers; and
- special storage information (e.g. picric acid must be stored underwater because it becomes explosive when dry; some containers must be kept upright, etc.).

g) Special Shipping Information

Information must be provided here related to the safe shipment of the product. Consider factors such as sensitivity to shock, sensitivity to temperature, etc. The supplier may include reference to the TDG Class and Division.

8. Section 8: First Aid Measures

SECTION 8 — FIRST AID MEASURES
SPECIFIC MEASURES

The intent of this section is primarily to provide information necessary for the safe evacuation and immediate treatment of a person experiencing acute effects of overexposure to the controlled product. Information is meant for use by workers on site, including first aid personnel, and will normally expand on and must always be consistent with first aid measures on the label.

a) Specific Measures

Statement of steps to be taken during immediate treatment of an affected person. The form of treatment will vary with the degree of exposure to the product and its route of entry. Separate procedures for the management of each route of entry (i.e. inhalation, skin contact or absorption, and ingestion) will be necessary for most substances. Steps should be organized in chronological order of importance. The first step in any first aid sequence is to safely remove the worker, wherever possible, from the source of contamination.

It may be necessary to provide instructions to assist with the safety of first aid personnel (e.g. respirators, gloves), and information on available antidotes or other forms of treatment which should be communicated to personnel at receiving facilities for the injured person (e.g. hospitals, clinics). Information on the signs and symptoms of sub-acute effects or early warning symptoms of chronic effects may also be of assistance.

NOTE: Space limitations on the MSDS may require that more complete written procedures be developed at the workplace for use by first aid personnel.

9. Section 9: Preparation Date of the MSDS

SECTION 9 — PREPARATION DATE OF MSDS

PREPARED BY (GROUP,DEPARTMENT, ETC.)	PHONE NUMBER	DATE

WHMIS legislation requires that material safety data sheets be kept current and that they be prepared no earlier than three years prior to receipt of the product in the workplace. Information in this section is designed to help ensure compliance with this requirement.

4.3.4 THE GENERIC MATERIAL SAFETY DATA SHEET

It may be appropriate in some cases, where the chemical composition of a group of controlled products is similar, to produce a single generic MSDS that applies to the group of products. For example, a generic data sheet might be permissible for a series of coloured paints where the only difference from product to product is the pigment used.

However, if for any product in the group either:

1. the concentration of one or more ingredients in the product fall within different reporting ranges than for the same ingredient(s) in other products in the group; or
2. there is any other difference in hazard information required to be disclosed on the product; then

that difference in range of concentration or hazard information must be recorded on the data sheet for that particular product. If, for example, a yellow-coloured paint is more toxic because of the pigment used than other paints in the group, a note on the generic MSDS is required stating the yellow paint has the "following additional hazards . . ." See Section 4.3.3(2) of this Chapter on page 4-31 for a discussion of reporting ranges.

The supplier must list the product names that appear on the labels for all the products to which the generic data sheet applies.

APPENDIX A

INGREDIENT DISCLOSURE LIST

ISSUED 31 DECEMBER 1987

NOTE: The Ingredient Disclosure List is not a basis for classification. Its purpose is to assist with determining what hazardous ingredients must be listed on the material safety data sheet if they are contained in a controlled product.

Registration
SOR/88-64 31 December, 1987

HAZARDOUS PRODUCTS ACT

Ingredient Disclosure List

P. C. 1987-2719 31 December, 1987

Whereas the Minister of Consumer and Corporate Affairs has consulted with the government of each province and with such organizations representative of workers, organizations representative of employers and organizations representative of suppliers as the Minister deemed appropriate.

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of Consumer and Corporate Affairs, pursuant to subsection 17(1)* of the Hazardous Products Act, is pleased hereby to establish an Ingredient Disclosure List, in accordance with the schedule hereto, effective October 31, 1988.

Enregistrement
DORS/88-64 31 décembre 1987

LOI SUR LES PRODUITS DANGEREUX

Liste de divulgation des ingrédients

C.P. 1987-2719 31 décembre 1987

Vu que le ministre de la Consommation et des Corporations a consulté le gouvernement de chaque province et les organismes de représentation des travailleurs, des employeurs et des fournisseurs qu'il a estimé indiqués,

À ces causes, sur avis conforme du ministre de la Consommation et des Corporations et en vertu du paragraphe 17(1)* de la Loi sur les produits dangereux, il plaît à Son Excellence le Gouverneur général en conseil de prendre, à compter du 31 octobre 1988, la Liste de divulgation des ingrédients, ci-après.

SCHEDULE
INGREDIENT DISCLOSURE LIST

		Column I Ingredient		Column II
Item		Chemical Identity	CAS* Registry Number	Concentration (%-weight/weight)
1.	*(972)***	*Abies alba* oil	8021-27-0	1
2.	*(50)*	Abietic acid	514-10-3	0.1
3.	*(2)*	Acenaphthene	83-32-9	1
4.	*(3)*	Acetaldehyde	75-07-0	1
5.	*(4)*	*p*-Acetamidobenzenestibonic acid, sodium salt	138-31-8	1
6.	*(51)*	Acetic acid	64-19-7	1
7.	*(227)*	Acetic anhydride	108-24-7	1
8.	*(38)*	*o*-Acetoacetaniside	92-15-9	1
9.	*(40)*	*p*-Acetoaminoaniline	122-80-5	1
10.	*(41)*	Acetone	67-64-1	1
11.	*(42)*	Acetone cyanohydrin	75-86-5	1
12.	*(43)*	Acetonitrile	75-05-8	0.1
13.	*(44)*	Acetophenone	98-86-2	1
14.	*(46)*	4-Acetylaminobiphenyl	4075-79-0	1
15.	*(47)*	2-Acetylaminofluorene	53-96-3	0.1
16.	*(328)*	Acetyl bromide	506-96-7	1
17.	*(327)*	Acetylene tetrabromide	79-27-6	1
18.	*(1022)*	Acetyl iodide	507-02-8	1
19.	*(48)*	Acetyl methyl carbinol	513-86-0	1
20.	*(49)*	4-Acetylresorcinol	89-84-9	1
21.	*(1286)*	Acid orange 10	1936-15-8	1
22.	*(151)*	Acrolein	107-02-8	1
23.	*(152)*	Acrylamide	79-06-1	0.1
24.	*(52)*	Acrylic acid	79-10-7	1
25.	*(162)*	Acrylonitrile	107-13-1	0.1
26.	*(53)*	Adipic acid	124-04-9	1
27.	*(166)*	Adiponitrile	111-69-3	1
28.	*(192)*	Aldol	107-89-1	1
29.	*(5)*	Allyl acetate	591-87-7	1
30.	*(167)*	Allyl alcohol	107-18-6	1
31.	*(193)*	Allylamine	107-11-9	1
32.	*(329)*	Allyl bromide	106-95-6	1
33.	*(469)*	Allyl chloride	107-05-1	1
34.	*(430)*	Allyl chloroformate	2937-50-0	1
35.	*(583)*	Allyl cyanoacetate	13361-32-5	1
36.	*(806)*	Allyl ethyl ether	557-31-3	1
37.	*(920)*	Allyl formate	1838-59-1	1

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* S.C. 1987, c. 30, s. 1

* S.C. 1987, ch. 30, art. 1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
38.	(*807*)	Allyl glycidyl ether	106-92-3	0.1
39.	(*1057*)	Allyl isothiocyanate	57-06-7	1
40.	(*1088*)	Allyl methacrylate	96-05-9	1
41.	(*514*)	Allyl palladium chloride dimer	12012-95-2	1
42.	(*786*)	Allyl propyl disulfide	2179-59-1	1
43.	(*194*)	Allyl trichlorosilane	107-37-9	1
44.	(*195*)	alpha-Alumina	1344-28-1	1
45.	(*196*)	Aluminum alkyl compounds	—	1
46.	(*470*)	Aluminum chloride	7446-70-0	1
47.	(*197*)	Aluminum, elemental	7429-90-5	1
48.	(*899*)	Aluminum fluorosulfate, hydrate	73680-58-7	1
49.	(*1196*)	Aluminum nitrate	13473-90-0	1
50.	(*1298*)	Aluminum oxide	1344-28-1	1
51.	(*1410*)	Aluminum phosphide	20859-73-8	1
52.	(*914*)	Aluminum sodium fluoride	15096-52-3	1
53.	(*198*)	Aluminum, water-soluble salts, n.o.s.***	—	1
54.	(*203*)	1-Aminoanthraquinone	82-45-1	1
55.	(*204*)	2-Aminoanthraquinone	117-79-3	0.1
56.	(*205*)	Aminoazobenzene	60-09-3	1
57.	(*54*)	4-Aminoazobenzene-3,4′-disulfonic acid	101-50-8	1
58.	(*206*)	Aminoazotoluene	97-56-3	1
59.	(*55*)	2-Amino-*p*-benzenedisulfonic acid	98-44-2	1
60.	(*207*)	*m*-Aminobenzenesulfonic acid, sodium salt	1126-34-7	1
61.	(*56*)	*p*-Aminobenzoic acid	150-13-0	1
62.	(*208*)	2-Amino-4-chlorophenol	95-85-2	1
63.	(*210*)	4-Aminodiphenyl	92-67-1	0.1
64.	(*209*)	*p*-Aminodiphenylamine	101-54-2	0.1
65.	(*211*)	2-(2-Aminoethoxy)ethanol	929-06-6	1
66.	(*57*)	5-Amino-6-ethoxy-2-naphthalene- sulfonic acid	118-28-5	1
67.	(*212*)	Aminoethyl ethanolamine	111-41-1	0.1
68.	(*213*)	*N*-(2-aminoethyl)piperazine	140-31-8	1
69.	(*58*)	2-Amino-3-hydroxybenzoic acid	548-93-6	1
70.	(*214*)	1-Amino-2-methylanthraquinone	82-28-0	0.1
71.	(*59*)	2-Amino-1,5-naphthalenedisulfonic acid	117-62-4	1
72.	(*60*)	3-Amino-1,5-naphthalenedisulfonic acid	131-27-1	1
73.	(*61*)	6-Amino-1,3-naphthalenedisulfonic acid	118-33-2	1
74.	(*62*)	2-Amino-1-naphthalenesulfonic acid	81-16-3	1
75.	(*215*)	2-Amino-4-nitroaniline	99-56-9	1
76.	(*216*)	4-Amino-2-nitroaniline	5307-14-2	1
77.	(*217*)	*m*-Aminophenol	591-27-5	0.1
78.	(*218*)	*o*-Aminophenol	95-55-6	0.1
79.	(*219*)	*p*-Aminophenol	123-30-8	1
80.	(*220*)	*p*-Aminophenol hydrochloride	51-78-5	0.1
81.	(*221*)	Aminopropyldiethanolamine	4985-85-7	1
82.	(*222*)	*N*-Aminopropylmorpholine	123-00-2	1
83.	(*223*)	2-Aminopyridine	504-29-0	1
84.	(*63*)	4-Aminosalicylic acid	65-49-6	1
85.	(*224*)	1-Amino-2-thiourea	79-19-6	1
86.	(*225*)	Ammonia	7664-41-7	1
87.	(*306*)	Ammonium bisulfite	10192-30-0	1
88.	(*471*)	Ammonium chloride	12125-02-9	1
89.	(*447*)	Ammonium chloropalladate	19168-23-1	1
90.	(*449*)	Ammonium chloropalladite	13820-40-1	1
91.	(*456*)	Ammonium chloroplatinate	16919-58-7	0.1
92.	(*546*)	Ammonium chromate	7788-98-9	1
93.	(*686*)	Ammonium dichromate	7789-09-5	1
94.	(*758*)	Ammonium dinitro-*o*-cresolate	29595-25-3	1
95.	(*1512*)	Ammonium hydrogen sulfate	7783-20-2	1
96.	(*989*)	Ammonium hydroxide	1336-21-6	1
97.	(*1085*)	Ammonium metavanadate	7803-55-6	1
98.	(*1161*)	Ammonium molybdate	13106-76-8	1
99.	(*1441*)	Ammonium polysulfide	12259-92-6	1
100.	(*1511*)	Ammonium sulfamate	7773-06-0	1
101.	(*1555*)	Ammonium tellurate	13453-06-0	1
102.	(*1710*)	Ammonium vanadate	11115-67-6	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
103.	(*200*)	Amosite asbestos	12172-73-5	0.1
104.	(*6*)	*sec*-Amyl acetate	626-38-0	1
105.	(*64*)	Amyl acid phosphate	12789-46-7	1
106.	(*168*)	*n*-Amyl alcohol	71-41-0	1
107.	(*169*)	*sec*-Amyl alcohol	6032-29-7	1
108.	(*226*)	Amyltrichlorosilane	107-72-2	1
109.	(*240*)	Aniline	62-53-3	1
110.	(*241*)	Aniline hydrochloride	142-04-1	1
111.	(*242*)	4-Anilinophenol	122-37-2	1
112.	(*243*)	*o*-Anisaldehyde	135-02-4	1
113.	(*244*)	*p*-Anisaldehyde	123-11-5	1
114.	(*245*)	*o*-Anisidine	90-04-0	0.1
115.	(*246*)	*p*-Anisidine	104-94-9	1
116.	(*254*)	*o*-Anisidine antimonyl tartrate	64070-14-0	1
117.	(*247*)	Anisole	100-66-3	1
118.	(*472*)	Anisoyl chloride	100-07-2	1
119.	(*248*)	Anthanthrene	191-26-4	1
120.	(*249*)	Anthracene	120-12-7	1
121.	(*250*)	Antimony compounds, n.o.s.***	—	1
122.	(*251*)	Antimony, elemental	7440-36-0	1
123.	(*7*)	Antimony(III) acetate	6923-52-0	1
124.	(*1343*)	Antimony(V) pentafluoride	7783-70-2	1
125.	(*1652*)	Antimony(III) trichloride	10025-91-9	1
126.	(*1691*)	Antimony trioxide	1309-64-4	1
127.	(*257*)	Aroclor 1254 (PCB)	11097-69-1	0.1
128.	(*258*)	Aroclor 1260 (PCB)	11096-82-5	0.1
129.	(*65*)	Arsenic acid	7778-39-4	0.1
130.	(*266*)	Arsenic, elemental	7440-38-2	0.1
131.	(*1351*)	Arsenic pentoxide	1303-28-2	1
132.	(*265*)	Arsenic, water-soluble compounds, n.o.s.***	—	1
133.	(*1653*)	Arsenic(III) trichloride	7784-34-1	1
134.	(*1692*)	Arsenic trioxide	1327-53-3	0.1
135.	(*1700*)	Arsenic trisulfide	1303-33-9	1
136.	(*268*)	Arsine	7784-42-1	0.1
137.	(*199*)	Asbestos	1332-21-4	0.1
138.	(*270*)	1-Aziridineethanol	1072-52-2	1
139.	(*271*)	Azobenzene	103-33-3	1
140.	(*8*)	Barium acetate	543-80-6	1
141.	(*384*)	Barium carbonate	513-77-9	0.1
142.	(*473*)	Barium chloride	10361-37-2	1
143.	(*547*)	Barium chromate	10294-40-3	0.1
144.	(*901*)	Barium fluoride	7787-32-8	1
145.	(*1199*)	Barium nitrate	10022-31-8	1
146.	(*1495*)	Barium silicofluoride	17125-80-3	1
147.	(*273*)	Barium, water-soluble compounds, n.o.s.***	—	1
148.	(*555*)	Basic zinc chromate	50922-29-7	0.1
149.	(*274*)	Bauxite	1318-16-7	1
150.	(*275*)	Benzaldehyde	100-52-7	1
151.	(*281*)	Benz(*a*)anthracene	56-55-3	0.1
152.	(*276*)	Benzanthrone	82-05-3	1
153.	(*277*)	Benzene	71-43-2	0.1
154.	(*475*)	Benzene phosphonic thiodichloride	14684-25-4	1
155.	(*278*)	Benzenesulfonic acid, linear alkyl, sodium salt	68411-30-3	1
156.	(*474*)	Benzenesulfonyl chloride	98-09-9	1
157.	(*279*)	Benzidine	92-87-5	0.1
158.	(*280*)	Benzil	134-81-6	1
159.	(*284*)	Benzo(*b*)fluoranthene	205-99-2	0.1
160.	(*66*)	Benzoic acid	65-85-0	1
161.	(*285*)	*alpha*-Benzoin oxime	441-38-3	1
162.	(*286*)	Benzonitrile	100-47-0	1
163.	(*287*)	Benzo(*a*)pyrene	50-32-8	0.1
164.	(*288*)	*o*-Benzoquinone	583-63-1	1
165.	(*289*)	*p*-Benzoquinone	106-51-4	1
166.	(*478*)	Benzotrichloride	98-07-7	0.1
167.	(*476*)	Benzoyl chloride	98-88-4	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
168.	(*1362*)	Benzoyl peroxide	94-36-0	1
169.	(*170*)	Benzyl alcohol	100-51-6	1
170.	(*330*)	Benzyl bromide	100-39-0	1
171.	(*477*)	Benzyl chloride	100-44-7	1
172.	(*431*)	Benzyl chloroformate	501-53-1	1
173.	(*681*)	Benzyl dichloride	98-87-3	1
174.	(*290*)	Benzyldimethylamine	103-83-3	1
175.	(*808*)	Benzyl ether	103-50-4	1
176.	(*291*)	Benzylidene acetone	122-57-6	1
177.	(*1023*)	Benzyl iodide	620-05-3	1
178.	(*292*)	Bertrondite	12161-82-9	0.1
179.	(*293*)	Beryl	1302-52-9	0.1
180.	(*479*)	Beryllium chloride	7787-47-5	0.1
181.	(*294*)	Beryllium compounds, n.o.s.***	—	0.1
182.	(*295*)	Beryllium, elemental	7440-41-7	0.1
183.	(*902*)	Beryllium fluoride	7787-49-7	0.1
184.	(*990*)	Beryllium hydroxide	13327-32-7	0.1
185.	(*1299*)	Beryllium oxide	1304-56-9	0.1
186.	(*1514*)	Beryllium sulfate	13510-49-1	0.1
187.	(*296*)	Bis(4-amino-1-anthraquinonyl)amine	128-87-0	1
188.	(*297*)	1,4-Bis(aminomethyl)cyclohexane	2549-93-1	1
189.	(*298*)	*N,N*-Bis(3-aminopropyl)methylamine	105-83-9	1
190.	(*840*)	Bis(2-chloroisopropyl) ether	39638-32-9	1
191.	(*841*)	Bis(chloromethyl) ether	542-88-1	0.1
192.	(*515*)	Bis(di-(*beta*-chloroethyl)sulfide) palladous chloride	64047-28-5	1
193.	(*299*)	1,2-Bis(dimethylamino)ethane	110-18-9	1
194.	(*164*)	Bis(2-ethylhexyl) adipate	103-23-1	0.1
195.	(*300*)	Bis(2-ethylhexyloxycarbonylmethyl- thio)dibutylstannane	25168-24-5	1
196.	(*301*)	Bis((2-ethylhexyloxy)maleoloxy) dibutylstannane	15546-12-0	1
197.	(*1421*)	Bis(2-methoxyethyl)phthalate	117-82-8	0.1
198.	(*1559*)	Bismuth telluride	1304-82-1	1
199.	(*302*)	Bisphenol A	80-05-7	1
200.	(*809*)	Bisphenol A diglycidyl ether	1675-54-3	1
201.	(*304*)	1,4-Bis(*p*-tolylamino)anthraquinone	128-80-3	1
202.	(*1300*)	Bis(tributyltin)oxide	56-35-9	1
203.	(*1301*)	Bis(tris(2-methyl-2-phenylpropyl) tin)oxide	13356-08-6	1
204.	(*67*)	Boric acid	10043-35-3	1
205.	(*228*)	Boric anhydride	1303-86-2	1
206.	(*1636*)	Boron tribromide	10294-33-4	1
207.	(*1654*)	Boron trichloride	10294-34-5	1
208.	(*1674*)	Boron trifluoride	7637-07-2	1
209.	(*1675*)	Boron trifluoride diethyletherate	109-63-7	1
210.	(*1676*)	Boron trifluoride dihydrate	13319-75-0	1
211.	(*321*)	Bromine	7726-95-6	1
212.	(*480*)	Bromine chloride	13863-41-7	1
213.	(*1344*)	Bromine pentafluoride	7789-30-2	1
214.	(*1677*)	Bromine trifluoride	7787-71-5	1
215.	(*68*)	Bromoacetic acid	79-08-3	1
216.	(*324*)	Bromoacetone	598-31-2	1
217.	(*331*)	Bromoacetyl bromide	598-21-0	1
218.	(*589*)	Bromobenzyl cyanide, all isomers	—	1
219.	(*325*)	Bromodichloromethane	75-27-4	1
220.	(*326*)	Bromoform	75-25-2	1
221.	(*346*)	Brucine	357-57-3	1
222.	(*349*)	Butadiene	106-99-0	0.1
223.	(*350*)	Butane	106-97-8	1
224.	(*351*)	1,3-Butanediol	107-88-0	0.1
225.	(*724*)	1,4-Butanediol dimethacrylate	2082-81-7	1
226.	(*352*)	2,3-Butanedione	431-03-8	1
227.	(*353*)	1,4-Butanesultone	1633-83-6	1
228.	(*355*)	*sec*-Butanol	78-92-2	1
229.	(*356*)	*tert*-Butanol	75-65-0	1
230.	(*9*)	*n*-Butyl acetate	123-86-4	1
231.	(*10*)	*sec*-Butyl acetate	105-46-4	1
232.	(*11*)	*tert*-Butyl acetate	540-88-5	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
233.	(*153*)	Butyl acrylate	141-32-2	1
234.	(*354*)	*n*-Butyl alcohol	71-36-3	1
235.	(*357*)	Butylamine	109-73-9	1
236.	(*358*)	*N*-(*n*-Butyl)aniline	1126-78-9	1
237.	(*984*)	Butylated hydroxyanisole (BHA)	25013-16-5	1
238.	(*1007*)	Butylated hydroxytoluene (BHT)	128-37-0	1
239.	(*282*)	Butyl benzoate	136-60-7	1
240.	(69)	*p*-*tert*-Butylbenzoic acid	98-73-7	0.1
241.	(*1415*)	Butyl benzyl phthalate	85-68-7	1
242.	(*332*)	*n*-Butyl bromide	109-65-9	0.1
243.	(*359*)	4-*tert*-Butylcatechol	98-29-3	1
244.	(*433*)	*n*-Butyl chloroformate	592-34-7	1
245.	(*432*)	*tert*-Butylcyclohexyl chloroformate	70042-58-9	1
246.	(*810*)	Butyl glycidyl ether	2426-08-6	0.1
247.	(*981*)	*tert*-Butyl hydroperoxide	75-91-2	1
248.	(*360*)	*N*-(*n*-Butyl)imidazole	4316-42-1	1
249.	(*1035*)	*n*-Butyl isocyanate	111-36-4	0.1
250.	(*1036*)	*tert*-Butyl isocyanate	1609-86-5	1
251.	(*1062*)	*n*-Butyl lactate	138-22-7	1
252.	(*361*)	Butyl mercaptan	109-79-5	1
253.	(*1285*)	Butyl oleate	142-77-8	1
254.	(*1361*)	*tert*-Butyl peroxyacetate	107-71-1	1
255.	(*362*)	*m*-Butylphenol	4074-43-5	1
256.	(*363*)	*o*-Butylphenol	3180-09-4	1
257.	(*364*)	*o*-*sec*-Butylphenol	89-72-5	1
258.	(*366*)	4-*tert*-Butylphenol	98-54-4	1
259.	(*365*)	*p*-Butylphenol	1638-22-8	1
260.	(70)	Butyl phosphoric acid	12788-93-1	1
261.	(*1447*)	Butyl propionate	590-01-2	1
262.	(*367*)	*m*-Butyltoluene	1595-04-6	1
263.	(*368*)	*o*-Butyltoluene	1595-11-5	1
264.	(*369*)	*p*-Butyltoluene	1595-05-7	1
265.	(*370*)	*p*-*tert*-Butyltoluene	98-51-1	1
266.	(*371*)	Butyltrichlorosilane	7521-80-4	1
267.	(*372*)	Butyraldehyde	123-72-8	1
268.	(*71*)	Butyric acid	107-92-6	1
269.	(*229*)	Butyric anhydride	106-31-0	1
270.	(*376*)	*Beta*-butyrolactone	3068-88-0	1
271.	(*377*)	Butyronitrile	109-74-0	1
272.	(*481*)	Butyryl chloride	141-75-3	1
273.	(*1287*)	C.I. Acid orange 52	547-58-0	1
274.	(*1719*)	C.I. Basic violet 1	548-62-9	0.1
275.	(*1060*)	C.I. Disperse yellow 3	2832-40-8	1
276.	(*269*)	C.I. Fluorescent brightener 46	6416-68-8	1
277.	(*314*)	C.I. Solvent blue 53	61969-42-4	1
278.	(*1272*)	C.I. Vat black 27	2379-81-9	1
279.	(*309*)	C.I. Vat blue 16	6424-76-6	1
280.	(*310*)	C.I. Vat blue 22	6373-20-2	1
281.	(*347*)	C.I. Vat brown 1	2475-33-4	1
282.	(*1714*)	C.I. Vat green 2	25704-81-8	1
283.	(*12*)	Cadmium acetate	543-90-8	1
284.	(*385*)	Cadmium carbonate	513-78-0	1
285.	(*482*)	Cadmium chloride	10108-64-2	0.1
286.	(*702*)	Cadmium diethyldithiocarbamate	14239-68-0	1
287.	(*378*)	Cadmium, elemental	7440-43-9	0.1
288.	(*886*)	Cadmium fluoborate	14486-19-2	1
289.	(*1024*)	Cadmium iodide	7790-80-9	1
290.	(*1200*)	Cadmium nitrate	10325-94-7	1
291.	(*1302*)	Cadmium oxide	1306-19-0	0.1
292.	(*379*)	Cadmium salts, n.o.s.***	—	1
293.	(*1502*)	Cadmium stearate	2223-93-0	1
294.	(*1510*)	Cadmium succinate	141-00-4	1
295.	(*1515*)	Cadmium sulfate	10124-36-4	0.1
296.	(*1543*)	Cadmium sulfide	1306-23-6	1
297.	(*260*)	Calcium arsenate	7778-44-1	0.1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
298.	(*307*)	Calcium bisulfite	13780-03-5	1
299.	(*548*)	Calcium chromate	13765-19-0	0.1
300.	(*582*)	Calcium cyanamide	156-62-7	1
301.	(*921*)	Calcium formate	544-17-2	1
302.	(*991*)	Calcium hydroxide	1305-62-0	1
303.	(*1162*)	Calcium molybdate	7789-82-4	1
304.	(*1303*)	Calcium oxide	1305-78-8	1
305.	(*380*)	(+)-Camphor	464-49-3	1
306.	(*72*)	Capric acid	334-48-5	1
307.	(*381*)	Caprolactam	105-60-2	1
308.	(*382*)	Caprolactone	502-44-3	1
309.	(*1271*)	Carbon black	1333-86-4	1
310.	(*770*)	Carbon dioxide	124-38-9	1
311.	(*787*)	Carbon disulfide	75-15-0	0.1
312.	(*1174*)	Carbon monoxide	630-08-0	0.1
313.	(*1569*)	Carbon tetrabromide	558-13-4	1
314.	(*1579*)	Carbon tetrachloride	56-23-5	0.1
315.	(*903*)	Carbonyl fluoride	353-50-4	1
316.	(*1544*)	Carbonyl sulfide	463-58-1	1
317.	(*394*)	Carvacrol	499-75-2	1
318.	(*976*)	Castor oil	8001-79-4	1
319.	(*395*)	Catechol	120-80-9	1
320.	(*973*)	Cedar wood oil	8000-27-9	1
321.	(*396*)	*alpha*-Cedrene	469-61-4	1
322.	(*811*)	Cedrol methyl ether	67874-81-1	1
323.	(*386*)	Cesium carbonate	534-17-8	1
324.	(*483*)	Cesium chloride	7647-17-8	1
325.	(*992*)	Cesium hydroxide	21351-79-1	1
326.	(*1202*)	Cesium nitrate	7789-18-6	1
327.	(*1518*)	Cesium sulfate	10294-54-9	1
328.	(*399*)	Chloral	75-87-6	1
329.	(*400*)	Chloramine-T	127-65-1	0.1
330.	(*73*)	Chloric acid	7790-93-4	1
331.	(*1309*)	Chlorinated diphenyl oxide	55720-99-5	1
332.	(*401*)	Chlorine	7782-50-5	1
333.	(*771*)	Chlorine dioxide	10049-04-4	1
334.	(*1345*)	Chlorine pentafluoride	13637-63-3	1
335.	(*1678*)	Chlorine trifluoride	7790-91-2	1
336.	(*404*)	Chloroacetaldehyde	107-20-0	1
337.	(*405*)	2-Chloroacetamide	79-07-2	1
338.	(*74*)	Chloroacetic acid	79-11-8	1
339.	(*408*)	Chloroacetonitrile	107-14-2	1
340.	(*409*)	Chloroacetophenone	532-27-4	1
341.	(*484*)	Chloroacetyl chloride	79-04-9	1
342.	(*410*)	3-Chloro-4-aminoaniline	615-66-7	1
343.	(*411*)	*m*-Chloroaniline	108-42-9	1
344.	(*412*)	*p*-Chloroaniline	106-47-8	1
345.	(*413*)	*p*-Chloro-*o*-anisidine	93-50-5	1
346.	(*414*)	Chlorobenzene	108-90-7	1
347.	(*415*)	*p*-Chlorobenzenesulfonic acid, sodium salt	5138-90-9	1
348.	(*75*)	*o*-Chlorobenzoic acid	118-91-2	1
349.	(*485*)	*p*-Chlorobenzyl chloride	104-83-6	1
350.	(*416*)	*o*-Chlorobenzylidene malononitrile	2698-41-1	1
351.	(*418*)	Chlorobromomethane	74-97-5	1
352.	(*419*)	1-Chloro-3-bromopropane	109-70-6	1
353.	(*421*)	Chloro-*m*-cresol, all isomers	—	1
354.	(*422*)	Chloro-*o*-cresol, all isomers	—	1
355.	(*423*)	Chloro-*p*-cresol, all isomers	—	1
356.	(*424*)	4-Chloro-2-cyclopentylphenol	13347-42-7	1
357.	(*425*)	Chlorodifluoroethane (FC 142)	75-68-3	1
358.	(*426*)	Chlorodifluoromethane (FC 22)	75-45-6	1
359.	(*427*)	3-Chloro-1,2-dihydroxypropane	96-24-2	1
360.	(*428*)	Chlorodinitrobenzene, all isomers	—	1
361.	(*417*)	Chlorodiphenyl (42% chlorine) (PCB)	53469-21-9	0.1
362.	(*1545*)	2-Chloroethyl ethyl sulfide	693-07-2	1
363.	(*429*)	Chloroform	67-66-3	0.1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
364.	(*441*)	Chloroformate compounds, n.o.s.***	—	1
365.	(*443*)	Chloro(*o*-hydroxyphenyl)mercury	90-03-9	1
366.	(*434*)	Chloromethyl chloroformate	22128-62-7	1
367.	(*812*)	Chloromethyl ethyl ether	3188-13-4	1
368.	(*1037*)	3-Chloro-4-methylphenyl isocyanate	28479-22-3	1
369.	(*444*)	Chloronitroaniline, all isomers	—	1
370.	(*76*)	2-Chloro-4-nitrobenzoic acid	99-60-5	1
371.	(*445*)	1-Chloro-1-nitropropane	600-25-9	1
372.	(*446*)	4-Chloro-3-nitrotoluene	89-60-1	1
373.	(*450*)	Chloropentafluoroethane (FC 115)	76-15-3	1
374.	(*451*)	*m*-Chlorophenol	108-43-0	1
375.	(*452*)	*o*-Chlorophenol	95-57-8	1
376.	(*453*)	*p*-Chlorophenol	106-48-9	1
377.	(*454*)	Chlorophenyltrichlorosilane	26571-79-9	1
378.	(*455*)	Chloropicrin	76-06-2	0.1
379.	(*77*)	Chloroplatinic acid	16941-12-1	0.1
380.	(*457*)	Chloroprene	126-99-8	0.1
381.	(*458*)	3-Chloro-1-propanol	627-30-5	1
382.	(*459*)	*o*-Chlorostyrene	2039-87-4	1
383.	(*78*)	Chlorosulfonic acid	7790-94-5	1
384.	(*461*)	*p*-Chlorothiophenol	106-54-7	1
385.	(*462*)	*o*-Chlorotoluene	95-49-8	1
386.	(*463*)	Chloro-*m*-toluidine (all isomers)	—	1
387.	(*464*)	Chloro-*o*-toluidine (all isomers) n.o.s.***	—	1
388.	(*465*)	4-Chloro-*o*-toluidine	95-69-2	1
389.	(*466*)	4-Chloro-*o*-toluidine hydrochloride	3165-93-3	1
390.	(*467*)	Chloro-*p*-toluidine	—	1
391.	(*79*)	Chromic acid	7738-94-5	1
392.	(*13*)	Chromium(III) acetate	1066-30-4	1
393.	(*557*)	Chromium carbonyl	13007-92-6	1
394.	(*486*)	Chromium(III) chloride	10025-73-7	1
395.	(*549*)	Chromium(III) chromate	24613-89-6	0.1
396.	(*558*)	Chromium(II) compounds, n.o.s.***	—	1
397.	(*559*)	Chromium(III) compounds, n.o.s.***	—	1
398.	(*560*)	Chromium(VI) compounds, n.o.s.***	—	1
399.	(*561*)	Chromium, elemental	7440-47-3	0.1
400.	(*1304*)	Chromium(III) oxide	1308-38-9	1
401.	(*1305*)	Chromium(VI) oxide	1333-82-0	0.1
402.	(*1540*)	Chromium(III) potassium sulfate	10141-00-1	1
403.	(*1516*)	Chromium(III) sulfate	10101-53-8	1
404.	(*487*)	Chromyl chloride	14977-61-8	1
405.	(*562*)	Chrysene	218-01-9	0.1
406.	(*201*)	Chrysotile asbestos	12001-29-5	0.1
407.	(*563*)	Cinnamaldehyde	104-55-2	0.1
408.	(*564*)	Citral	5392-40-5	1
409.	(*80*)	Citric acid	77-92-9	1
410.	(*937*)	Coal tar	8007-45-2	1
411.	(*1721*)	Coal tar pitch volatiles	65996-93-2	0.1
412.	(*14*)	Cobalt(II) acetate	71-48-7	1
413.	(*333*)	Cobalt(II) bromide	7789-43-7	1
414.	(*565*)	Cobalt carbonyl	10210-68-1	1
415.	(*488*)	Cobalt(II) chloride	7646-79-9	0.1
416.	(*788*)	Cobalt disulfide	12013-10-4	1
417.	(*566*)	Cobalt, elemental	7440-48-4	0.1
418.	(*858*)	Cobalt(II), *N,N'*-ethylenebis(3-fluorosalicylideneiminato)-	62207-76-5	1
419.	(*887*)	Cobalt(II) fluoborate	26490-63-1	1
420.	(*904*)	Cobalt(II) fluoride	10026-17-2	1
421.	(*567*)	Cobalt hydrocarbonyl	16842-03-8	1
422.	(*1163*)	Cobalt(II) molybdate	13762-14-6	1
423.	(*1201*)	Cobalt(II) nitrate	10141-05-6	1
424.	(*1306*)	Cobalt(II) oxide	1307-96-6	1
425.	(*1391*)	Cobalt(II) phosphate	13455-36-2	1
426.	(*1517*)	Cobalt(II) sulfate	10124-43-3	1
427.	(*1546*)	Cobalt(II) sulfide	1317-42-6	1
428.	(*985*)	Copper(II) carbonate hydroxide	12069-69-1	1

INGREDIENT DISCLOSURE LIST—*Continued*

Item		Column I Ingredient		Column II
		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
429.	*(489)*	Copper(I) chloride	7758-89-6	1
430.	*(490)*	Copper(II) chloride	1344-67-8	1
431.	*(577)*	Copper compounds, n.o.s.***	—	1
432.	*(739)*	Copper(II) dimethyldithiocarbamate	137-29-1	1
433.	*(578)*	Copper, elemental	7440-50-8	1
434.	*(1005)*	Copper(II) 8-hydroxyquinolinate	10380-28-6	1
435.	*(1182)*	Copper naphthenate	1338-02-9	1
436.	*(1203)*	Copper(II) nitrate	3251-23-8	1
437.	*(1307)*	Copper(I) oxide	1317-39-1	1
438.	*(1519)*	Copper(II) sulfate	7758-98-7	1
439.	*(1547)*	Copper(I) sulfide	22205-45-4	1
440.	*(1548)*	Copper(II) sulfide	1317-40-4	1
441.	*(568)*	Corundum	1302-74-5	1
442.	*(569)*	*p*-Cresidine	120-71-8	0.1
443.	*(570)*	Cresol	1319-77-3	1
444.	*(571)*	*m*-Cresol	108-39-4	1
445.	*(572)*	*o*-Cresol	95-48-7	1
446.	*(573)*	*p*-Cresol	106-44-5	1
447.	*(202)*	Crocidolite asbestos	12001-28-4	0.1
448.	*(574)*	Crotonaldehyde	4170-30-3	1
449.	*(575)*	(E)-Crotonaldehyde	123-73-9	1
450.	*(982)*	Cumene hydroperoxide	80-15-9	1
451.	*(171)*	Cuminic alcohol	536-60-7	1
452.	*(579)*	Cupferron	135-20-6	0.1
453.	*(591)*	Cupric cyanide	14763-77-0	1
454.	*(580)*	Cupriethylenediamine	13426-91-0	1
455.	*(581)*	Cyanamide	420-04-2	1
456.	*(590)*	Cyanide compounds, inorganic, n.o.s.***	—	1
457.	*(154)*	2-Cyanoethyl acrylate	106-71-8	1
458.	*(586)*	Cyanogen	460-19-5	1
459.	*(334)*	Cyanogen bromide	506-68-3	1
460.	*(491)*	Cyanogen chloride	506-77-4	1
461.	*(468)*	Cyanuric chloride	108-77-0	1
462.	*(435)*	Cyclobutyl chloroformate	81228-87-7	1
463.	*(599)*	1,5,9-Cyclododecatriene	4904-61-4	1
464.	*(600)*	Cycloheptatriene	544-25-2	1
465.	*(601)*	Cyclohexane	110-82-7	1
466.	*(602)*	Cyclohexanol	108-93-0	1
467.	*(603)*	Cyclohexanone	108-94-1	0.1
468.	*(1363)*	Cyclohexanone peroxide	78-18-2	0.1
469.	*(604)*	Cyclohexene	110-83-8	1
470.	*(605)*	Cyclohexenyl trichlorosilane	10137-69-6	1
471.	*(15)*	Cyclohexyl acetate	622-45-7	1
472.	*(606)*	Cyclohexylamine	108-91-8	0.1
473.	*(607)*	*N*-Cyclohexyl-2-benzothiazolesulfenamide	95-33-0	1
474.	*(1038)*	Cyclohexyl isocyanate	3173-53-3	0.1
475.	*(608)*	Cyclohexyltrichlorosilane	98-12-4	1
476.	*(609)*	1,3-Cyclopentadiene	542-92-7	1
477.	*(610)*	Cyclopentane	287-92-3	1
478.	*(611)*	Cyclopentanone	120-92-3	1
479.	*(612)*	*p*-Cymene	99-87-6	1
480.	*(613)*	Cytochalasin B	14930-96-2	1
481.	*(614)*	Decaborane	17702-41-9	1
482.	*(615)*	1-Decanol	112-30-1	1
483.	*(172)*	Diacetone alcohol	123-42-2	1
484.	*(1364)*	Diacetyl peroxide	110-22-5	1
485.	*(837)*	Diallyl ether	557-40-4	1
486.	*(621)*	2,4-Diaminoanisole	615-05-4	1
487.	*(1520)*	2,4-Diaminoanisole sulfate	39156-41-7	0.1
488.	*(622)*	1,4-Diaminoanthraquinone	128-95-0	1
489.	*(623)*	4,4'-Diaminodiphenylmethane (MDA)	101-77-9	0.1
490.	*(624)*	2,4-Diaminophenol dihydrochloride	137-09-7	0.1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
491.	(*625*)	1,3-Diaminopropane	109-76-2	1
492.	(*626*)	2,5-Diaminotoluene	95-70-5	1
493.	(*627*)	Diamminedichloropalladium	14323-43-4	1
494.	(*628*)	*cis*-Diamminedichloropalladium(II)	15684-18-1	1
495.	(*629*)	*cis*-Diamminedichloroplatinum(II)	15663-27-1	0.1
496.	(*630*)	Di-*n*-amylamine	2050-92-2	1
497.	(*631*)	Diazomethane	334-88-3	0.1
498.	(*634*)	Dibenz(*a,h*)acridine	226-36-8	0.1
499.	(*635*)	Dibenz(*a,j*)acridine	224-42-0	0.1
500.	(*632*)	4,4′-Dibenzamido-1,1′-dianthrimide	128-79-0	1
501.	(*636*)	Dibenz(*a,h*)anthracene	53-70-3	0.1
502.	(*633*)	4,4′-Dibenzanthronyl	116-90-5	1
503.	(*637*)	7H-Dibenzo(*c,g*)carbazole	194-59-2	0.1
504.	(*638*)	Dibenzo(*a,h*)pyrene	189-64-0	0.1
505.	(*639*)	Dibenzo(*a,i*)pyrene	189-55-9	0.1
506.	(*640*)	Dibenzo(*a,l*)pyrene	191-30-0	1
507.	(*789*)	2,2′-Dibenzothiazyl disulfide	120-78-5	1
508.	(*790*)	Dibenzyl disulfide	150-60-7	1
509.	(*641*)	Diborane	19287-45-7	1
510.	(*642*)	1,2-Dibromo-3-butanone	25109-57-3	1
511.	(*643*)	1,2-Dibromo-3-chloropropane	96-12-8	0.1
512.	(*644*)	Dibromomethane	74-95-3	1
513.	(*645*)	1,2-Dibromopropane	78-75-1	1
514.	(*646*)	Di-(*n*-butyl)amine	111-92-2	1
515.	(*647*)	*N,N*-Di-*n*-butylaminoethanol	102-81-8	1
516.	(*1392*)	Dibutyl phosphate	107-66-4	1
517.	(*1403*)	Dibutyl phosphite	1809-19-4	1
518.	(*1416*)	Dibutyl phthalate	84-74-2	1
519.	(*618*)	Dibutyltin diacetate	1067-33-0	1
520.	(*1070*)	Dibutyltin maleate	78-04-6	1
521.	(*705*)	Di-*n*-butyltin di-2-ethylhexanoate	2781-10-4	1
522.	(*723*)	Dibutyltin dilaurate	77-58-7	1
523.	(*747*)	Di-*n*-butyltin di(monobutyl)maleate	15546-16-4	1
524.	(*785*)	Dibutyltin distearate	5847-55-2	1
525.	(*682*)	Dibutyltin dichloride	683-18-1	1
526.	(*1141*)	Dibutyltin methyl maleate	15546-11-9	1
527.	(*1308*)	Dibutyltin oxide	818-08-6	1
528.	(*791*)	Dibutyltin sulfide	4253-22-9	1
529.	(*649*)	Dichloroacetaldehyde	79-02-7	1
530.	(*650*)	1,3-Dichloroacetone	534-07-6	1
531.	(*492*)	Dichloroacetyl chloride	79-36-7	1
532.	(*651*)	Dichloroacetylene	7572-29-4	1
533.	(*652*)	Dichloroaniline, all isomers	—	1
534.	(*653*)	3,4-Dichloroaniline	95-76-1	1
535.	(*654*)	*m*-Dichlorobenzene	541-73-1	1
536.	(*655*)	*o*-Dichlorobenzene	95-50-1	1
537.	(*656*)	*p*-Dichlorobenzene	106-46-7	1
538.	(*657*)	3,3′-Dichlorobenzidine	91-94-1	0.1
539.	(*658*)	1,1-Dichloro-2,2-bis(*p*-chlorophenyl) ethylene	72-55-9	1
540.	(*659*)	Dichlorobutene	11069-19-5	1
541.	(*660*)	1,4-Dichloro-2-butene	764-41-0	1
542.	(*661*)	3,4-Dichloro-1-butene	760-23-6	0.1
543.	(*662*)	Dichlorodifluoromethane (FC 12)	75-71-8	1
544.	(*663*)	1,3-Dichloro-5,5-dimethylhydantoin	118-52-5	1
545.	(*664*)	1,1-Dichloroethane	75-34-3	1
546.	(*665*)	*sym*-Dichloroethylene	540-59-0	1
547.	(*838*)	Dichloroethyl ether	111-44-4	1
548.	(*666*)	Dichloroisocyanuric acid, potassium salt	2244-21-5	1
549.	(*667*)	Dichloroisocyanuric acid, sodium salt	2893-78-9	1
550.	(*839*)	Dichloroisopropyl ether	108-60-1	1
551.	(*668*)	Dichloromonofluoromethane (FC 21)	75-43-4	1
552.	(*669*)	2,6-Dichloro-4-nitroaniline	99-30-9	1
553.	(*670*)	2,5-Dichloronitrobenzene	89-61-2	1
554.	(*671*)	3,4-Dichloronitrobenzene	99-54-7	1
555.	(*672*)	1,1-Dichloro-1-nitroethane	594-72-9	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
556.	(*673*)	Dichlorophen	97-23-4	1
557.	(*674*)	2,6-Dichlorophenol	87-65-0	1
558.	(*1039*)	Dichlorophenyl isocyanate, all isomers	—	0.1
559.	(*675*)	Dichlorophenyltrichlorosilane	27137-85-5	1
560.	(*676*)	1,3-Dichloro-2-propanol	96-23-1	1
561.	(*677*)	Dichloropropene	542-75-6	1
562.	(*678*)	Dichlorosilane	4109-96-0	1
563.	(*679*)	1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	1
564.	(*680*)	Dichlorotriphenylantimony	594-31-0	1
565.	(*690*)	Dicyclohexylamine	101-83-7	0.1
566.	(*1204*)	Dicyclohexylammonium nitrate	3882-06-2	1
567.	(*691*)	Dicyclopentadiene	77-73-6	1
568.	(*692*)	Diepoxybutane	1464-53-5	0.1
569.	(*693*)	Diethanolamine	111-42-2	1
570.	(*163*)	Diethyl adipate	141-28-6	0.1
571.	(*694*)	Diethylamine	109-89-7	1
572.	(*695*)	Diethylaminoethanol	100-37-8	1
573.	(*1089*)	2-(*N,N*-Diethylamino)ethyl methacrylate	105-16-8	1
574.	(*696*)	3-(Diethylamino)propylamine	104-78-9	1
575.	(*697*)	*N,N*-Diethylaniline	91-66-7	1
576.	(*698*)	Diethylbenzene	25340-17-4	1
577.	(*699*)	Diethyl carbinol	584-02-1	1
578.	(*701*)	Diethyldichlorosilane	1719-53-5	1
579.	(*813*)	Diethylene glycol diethyl ether	112-36-7	1
580.	(*725*)	Diethylene glycol dimethacrylate	2358-84-1	1
581.	(*814*)	Diethylene glycol monobutyl ether	112-34-5	1
582.	(*815*)	Diethylene glycol monoethyl ether	111-90-0	1
583.	(*816*)	Diethylene glycol monohexyl ether	112-59-4	1
584.	(*817*)	Diethylene glycol monomethyl ether	111-77-3	1
585.	(*818*)	Diethylene glycol monophenyl ether	104-68-7	1
586.	(*704*)	Diethylenetriamine	111-40-0	0.1
587.	(*706*)	Di(2-ethylhexyl)amine	106-20-7	1
588.	(*925*)	Di(2-ethylhexyl) fumarate	141-02-6	1
589.	(*81*)	Di(2-ethylhexyl)phosphoric acid	298-07-7	1
590.	(*1418*)	Di(2-ethylhexyl)phthalate (DEHP)	117-81-7	0.1
591.	(*707*)	1,2-Diethylhydrazine	1615-80-1	0.1
592.	(*700*)	Diethyl ketone	96-22-0	1
593.	(*708*)	Diethylmercury	627-44-1	0.1
594.	(*1417*)	Diethyl phthalate	84-66-2	0.1
595.	(*1521*)	Diethyl sulfate	64-67-5	0.1
596.	(*1549*)	Diethyl sulfide	352-93-2	1
597.	(*493*)	Diethylthiophosphoryl chloride	2524-04-1	1
598.	(*709*)	Difluorodibromomethane	75-61-6	1
599.	(*82*)	Difluorophosphoric acid	13779-41-4	1
600.	(*819*)	Diglycidyl ether	2238-07-5	0.1
601.	(*1419*)	Diheptyl phthalate	3648-21-3	0.1
602.	(*712*)	1,4-Dihydroxy-9,10-anthracenedione	81-64-1	1
603.	(*713*)	1,2-Dihydroxyanthraquinone	72-48-0	1
604.	(*714*)	1,8-Dihydroxyanthraquinone	117-10-2	1
605.	(*715*)	2,4-Dihydroxybenzophenone	131-56-6	1
606.	(*165*)	Diisobutyl adipate	141-04-8	0.1
607.	(*716*)	Diisobutyl ketone	108-83-8	1
608.	(*1393*)	Diisooctyl acid phosphate	27215-10-7	1
609.	(*720*)	Diisopropanolamine	110-97-4	1
610.	(*721*)	Diisopropylamine	108-18-9	1
611.	(*722*)	*N,N*-Diisopropyl ethanolamine	96-80-0	1
612.	(*648*)	Diketene	674-82-8	1
613.	(*1614*)	Dilauryl *beta*-thiodipropionate	123-28-4	1
614.	(*727*)	3,3'-Dimethoxybenzidine	119-90-4	0.1
615.	(*728*)	*N,N*-Dimethylacetamide	127-19-5	1
616.	(*729*)	Dimethylamine	124-40-3	1
617.	(*730*)	Dimethylaminoacetonitrile	926-64-7	1
618.	(*731*)	4-Dimethylaminoazobenzene	60-11-7	0.1
619.	(*732*)	3-Dimethylamino-*N,N*-dimethylpropionamide	17268-47-2	1
620.	(*1090*)	*N,N*-Dimethylaminoethyl methacrylate	2867-47-2	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number*	Concentration (%-weight/weight)
621.	(*733*)	*N,N*-Dimethylaniline	121-69-7	1
622.	(*734*)	7,12-Dimethylbenz(*a*)anthracene	57-97-6	0.1
623.	(*735*)	2,3-Dimethylbutane	79-29-8	1
624.	(*494*)	*N,N*-Dimethylcarbamoyl chloride	79-44-7	0.1
625.	(*736*)	*N,N*-Dimethylcyclohexylamine	98-94-2	1
626.	(*737*)	Dimethyldichlorosilane	75-78-5	1
627.	(*738*)	Dimethyldiethoxysilane	78-62-6	1
628.	(*741*)	*N,N*-Dimethylformamide	68-12-2	1
629.	(*742*)	1,1-Dimethylhydrazine	57-14-7	0.1
630.	(*743*)	1,2-Dimethylhydrazine	540-73-8	1
631.	(*744*)	Dimethylmercury	593-74-8	0.1
632.	(*1408*)	*O,O*-Dimethylphosphorochloridothioate	2524-03-0	1
633.	(*1420*)	Dimethyl phthalate	131-11-3	1
634.	(*1422*)	Dimethyl *p*-phthalate	120-61-6	1
635.	(*745*)	Dimethylpropylamine	926-63-6	1
636.	(*1522*)	Dimethyl sulfate	77-78-1	0.1
637.	(*746*)	Dimethyl sulfoxide	67-68-5	1
638.	(*495*)	Dimethyl thiophosphoryl chloride	—	1
639.	(*748*)	*N,N'*-Di-*beta*-naphthyl-*p*-phenylene-diamine	93-46-9	1
640.	(*752*)	Dinitroaniline, all isomers	—	1
641.	(*753*)	2,4-Dinitroaniline	97-02-9	1
642.	(*754*)	*m*-Dinitrobenzene	99-65-0	1
643.	(*755*)	*o*-Dinitrobenzene	528-29-0	1
644.	(*756*)	*p*-Dinitrobenzene	100-25-4	1
645.	(*757*)	4,6-Dinitro-*o*-cresol	534-52-1	1
646.	(*760*)	Dinitrophenol, all isomers (except 2,4-dinitrophenol)	—	1
647.	(*761*)	2,4-Dinitrophenol	51-28-5	0.1
648.	(*762*)	2,4-Dinitrophenylhydrazine	119-26-6	1
649.	(*763*)	Dinitrosopentamethylenetetramine	101-25-7	1
650.	(*764*)	1,4-Dinitrosopiperazine	140-79-4	0.1
651.	(*765*)	Dinitrotoluene, all isomers	—	1
652.	(*766*)	2,4-Dinitrotoluene	121-14-2	1
653.	(*1423*)	Dioctyl phthalate	117-84-0	1
654.	(*1542*)	Dioctyl sodium sulfosuccinate	577-11-7	1
655.	(*767*)	1,4-Dioxane	123-91-1	0.1
656.	(*768*)	1,3-Dioxolane	646-66-0	1
657.	(*777*)	Dipentene	138-86-3	1
658.	(*780*)	Diphenyl	92-52-4	1
659.	(*778*)	*N,N*-Diphenylamine	122-39-4	0.1
660.	(*779*)	Diphenyldichlorosilane	80-10-4	1
661.	(*820*)	Diphenyl ether	101-84-8	1
662.	(*781*)	Diphenylmercury	587-85-9	1
663.	(*717*)	4,4'-Diphenylmethane diisocyanate	101-68-8	0.1
664.	(*335*)	Diphenyl methyl bromide	776-74-9	1
665.	(*782*)	*N,N'*-Diphenyl-*p*-phenylenediamine	74-31-7	0.1
666.	(*943*)	Dipotassium hexabromoplatinate	16920-93-7	0.1
667.	(*950*)	Dipotassium hexachloropalladate	16919-73-6	1
668.	(*1568*)	Dipotassium tetrabromopalladate	13826-93-2	1
669.	(*821*)	Dipropylene glycol methyl ether	34590-94-8	1
670.	(*783*)	Dipropyl ketone	123-19-3	1
671.	(*1273*)	Direct black meta	1937-37-7	0.1
672.	(*313*)	Direct blue 53	314-13-6	1
673.	(*312*)	Direct blue 6 (technical grade)	2602-46-2	0.1
674.	(*348*)	Direct brown 95 (technical grade)	16071-86-6	0.1
675.	(*303*)	Disodium 4,4'-bis(2-sulfostyryl)biphenyl	27344-41-8	0.1
676.	(*798*)	Disodium calcium EDTA	62-33-9	0.1
677.	(*259*)	Disodium hydrogen arsenate	7778-43-0	1
678.	(*794*)	*m*-Divinylbenzene	108-57-6	1
679.	(*83*)	Dodecylbenzenesulfonic acid	27176-87-0	1
680.	(*796*)	*alpha*-(Dodecylphenyl)-*omega*-hydroxy-poly(oxy-1,2-ethanediyl)	9014-92-0	1
681.	(*797*)	Dodecyl trichlorosilane	4484-72-4	1
682.	(*800*)	Epibromohydrin	3132-64-7	1
683.	(*801*)	Epichlorohydrin	106-89-8	0.1
684.	(*805*)	Ethanol	64-17-5	0.1
685.	(*846*)	2-Ethoxy-3,4-dihydro-2H-pyran	103-75-3	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
686.	(*847*)	2-Ethoxyethanol	110-80-5	0.1
687.	(*16*)	2-Ethoxyethyl acetate	111-15-9	0.1
688.	(*181*)	Ethoxylated lauryl alcohol	9002-92-0	1
689.	(*17*)	Ethyl acetate	141-78-6	1
690.	(*156*)	Ethyl acrylate	140-88-5	1
691.	(*848*)	Ethylamine	75-04-7	1
692.	(*849*)	2-Ethylaminoethanol	110-73-6	1
693.	(*850*)	Ethyl *sec*-amyl ketone	541-85-5	1
694.	(*851*)	Ethyl *n*-amyl ketone	106-68-3	1
695.	(*852*)	2-Ethylaniline	578-54-1	1
696.	(*853*)	*N*-Ethylaniline	103-69-5	1
697.	(*854*)	Ethylbenzene	100-41-4	0.1
698.	(*855*)	*N*-Ethyl-*N*-benzylaniline	92-59-1	1
699.	(*856*)	*N*-Ethylbenzyltoluidine, all isomers	—	1
700.	(*336*)	Ethyl bromide	74-96-4	1
701.	(*322*)	Ethyl bromoacetate	105-36-2	1
702.	(*857*)	Ethyl butyl ketone	106-35-4	1
703.	(*373*)	Ethyl butyrate	105-54-4	1
704.	(*84*)	2-Ethylbutyric acid	88-09-5	1
705.	(*497*)	Ethyl chloride	75-00-3	1
706.	(*406*)	Ethyl chloroacetate	105-39-5	1
707.	(*436*)	Ethyl chloroformate	541-41-3	1
708.	(*460*)	Ethyl chlorothioformate	2812-73-9	1
709.	(*576*)	Ethyl crotonate	623-70-1	1
710.	(*592*)	Ethyl cyanide	107-12-0	1
711.	(*584*)	Ethyl cyanoacetate	105-56-6	1
712.	(*402*)	Ethylene chlorohydrin	107-07-3	1
713.	(*859*)	Ethylene diamine	107-15-3	0.1
714.	(*337*)	Ethylene dibromide (1,2-dibromo-ethane)	106-93-4	0.1
715.	(*498*)	Ethylene dichloride (1,2-dichloro-ethane)	107-06-2	1
716.	(*860*)	Ethylene glycol	107-21-1	1
717.	(*711*)	Ethylene glycol diformate	629-15-2	1
718.	(*749*)	Ethylene glycol dinitrate	628-96-6	1
719.	(*822*)	Ethylene glycol isopropyl ether	109-59-1	1
720.	(*823*)	Ethylene glycol monobenzyl ether	622-08-2	1
721.	(*824*)	Ethylene glycol monobutyl ether	111-76-2	1
722.	(*155*)	Ethylene glycol monoethyl ether acrylate	106-74-1	1
723.	(*825*)	Ethylene glycol monophenyl ether	122-99-6	1
724.	(*861*)	Ethyleneimine	151-56-4	1
725.	(*1310*)	Ethylene oxide	75-21-8	0.1
726.	(*862*)	Ethylene thiourea	96-45-7	0.1
727.	(*863*)	Ethyl ether	60-29-7	1
728.	(*922*)	Ethyl formate	109-94-4	1
729.	(*864*)	2-Ethylhexaldehyde	123-05-7	1
730.	(*865*)	2-Ethyl-1,3-hexanediol	94-96-2	1
731.	(*967*)	Ethyl hexanoate	123-66-0	1
732.	(*85*)	2-Ethylhexoic acid	149-57-5	1
733.	(*157*)	2-Ethylhexyl acrylate	103-11-7	1
734.	(*173*)	2-Ethylhexyl alcohol	104-76-7	1
735.	(*866*)	2-Ethylhexylamine	104-75-6	1
736.	(*437*)	2-Ethylhexyl chloroformate	24468-13-1	1
737.	(*1092*)	2-Ethylhexyl methacrylate	688-84-6	1
738.	(*867*)	2-(2-Ethylhexyloxy)ethanol	1559-35-9	1
739.	(*868*)	5-Ethylidene-2-norbornene	16219-75-3	1
740.	(*1034*)	Ethyl isobutyrate	97-62-1	1
741.	(*1040*)	Ethyl isocyanate	109-90-0	0.1
742.	(*870*)	Ethyl mercaptan	75-08-1	1
743.	(*1101*)	Ethyl methanesulfonate	62-50-0	1
744.	(*1538*)	7-Ethyl-2-methyl-4-undecanolsulfate, sodium salt	139-88-8	1
745.	(*872*)	*N*-Ethylmorpholine	100-74-3	1
746.	(*1275*)	Ethyl nonanoate	123-29-5	1
747.	(*1289*)	Ethyl orthoformate	122-51-0	1
748.	(*1293*)	Ethyl oxalate	95-92-1	1
749.	(*873*)	Ethyl phenyl dichlorosilane	1125-27-5	1
750.	(*499*)	Ethyl phosphonous dichloride	1498-40-4	1
751.	(*1409*)	Ethyl phosphorodichloridate	1498-51-7	1
752.	(*1448*)	Ethyl propionate	105-37-3	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
753.	(*1485*)	Ethyl silicate	78-10-4	1
754.	(*86*)	Ethylsulphuric acid	540-82-9	1
755.	(*875*)	2-(Ethylthio)ethanol	110-77-0	1
756.	(*876*)	*N*-Ethyl-*m*-toluidine	102-27-2	1
757.	(*877*)	*N*-Ethyl-*o*-toluidine	94-68-8	1
758.	(*878*)	*N*-Ethyl-*p*-toluidine	622-57-1	1
759.	(*174*)	*alpha*-Fenchyl alcohol	512-13-0	1
760.	(*1292*)	Ferric ammonium oxalate	14221-47-7	1
761.	(*799*)	Ferric EDTA	17099-81-9	1
762.	(*1327*)	Ferric oxide	1309-37-1	1
763.	(*880*)	Ferrocene	102-54-5	1
764.	(*881*)	Ferrosilicon	8049-17-0	1
765.	(*542*)	Ferrous chloride	7758-94-3	1
766.	(*1536*)	Ferrous sulphate	7720-78-7	1
767.	(*882*)	Ferrovanadium	12604-58-9	1
768.	(*884*)	Fibrous glass	—	1
769.	(*885*)	Fluoborate compounds, n.o.s.***	—	1
770.	(*892*)	Fluoranthene	206-44-0	1
771.	(*893*)	Fluorapatite	1306-05-4	1
772.	(*37*)	Fluorescein mercuric acetate	3570-80-7	1
773.	(*915*)	Fluoride compounds, inorganic, n.o.s.***	—	1
774.	(*891*)	Fluorine	7782-41-4	1
775.	(*894*)	2-Fluoroaniline	348-54-9	1
776.	(*895*)	4-Fluoroaniline	371-40-4	1
777.	(*896*)	1-Fluoro-2-bromobenzene	1072-85-1	1
778.	(*897*)	1-Fluoro-3-bromobenzene	1073-06-9	1
779.	(*87*)	Fluorosilicic acid	16961-83-4	1
780.	(*88*)	Fluorosulfonic acid	7789-21-1	1
781.	(*918*)	Formaldehyde	50-00-0	0.1
782.	(*919*)	Formamide	75-12-7	0.1
783.	(*89*)	Formic acid	64-18-6	1
784.	(*90*)	Fumaric acid	110-17-8	1
785.	(*500*)	Fumaryl chloride	627-63-4	1
786.	(*926*)	Furfural	98-01-1	1
787.	(*175*)	Furfuryl alcohol	98-00-0	1
788.	(*927*)	Furylfuramide (AF-2)	3688-53-7	0.1
789.	(*1655*)	Gadolinium trichloride	10138-52-0	1
790.	(*501*)	Gallium(III) chloride	13450-90-3	1
791.	(*931*)	Gallium, elemental	7440-55-3	1
792.	(*1205*)	Gallium(III) nitrate	13494-90-1	1
793.	(*802*)	Gasoline	8006-61-9	1
794.	(*1595*)	Germanium tetrahydride	7782-65-2	1
795.	(*932*)	Glutaraldehyde	111-30-8	1
796.	(*933*)	Glycidaldehyde	765-34-4	1
797.	(*934*)	Glycidol	556-52-5	1
798.	(*158*)	Glycidyl acrylate	106-90-1	1
799.	(*935*)	Glyoxal	107-22-2	1
800.	(*1618*)	Gold sodium thiosulfate	10233-88-2	1
801.	(*1657*)	Gold trichloride	13453-07-1	1
802.	(*929*)	Guaiacol	90-05-1	1
803.	(*930*)	*m*-Guaiacol	150-19-6	1
804.	(*936*)	Gum tragacanth	9000-65-1	0.1
805.	(*938*)	Hafnium, elemental	7440-58-6	1
806.	(*940*)	Heptane	142-82-5	1
807.	(*941*)	2-Heptanol	543-49-7	1
808.	(*942*)	3-Heptanol	589-82-2	1
809.	(*1164*)	Hexaammonium molybdate	12027-67-7	1
810.	(*944*)	Hexachloroacetone	116-16-5	1
811.	(*945*)	Hexachlorobenzene	118-74-1	1
812.	(*946*)	Hexachloro-1,3-butadiene	87-68-3	0.1
813.	(*947*)	Hexachlorocyclopentadiene	77-47-4	1
814.	(*948*)	Hexachloroethane	67-72-1	1
815.	(*949*)	Hexachloronaphthalene	1335-87-1	1
816.	(*951*)	Hexachlorophene	70-30-4	0.1
817.	(*953*)	Hexadecyltrichlorosilane	5894-60-0	1

INGREDIENT DISCLOSURE LIST—*Continued*

Item		Column I Ingredient Chemical Identity	 CAS Registry Number	Column II Concentration (%-weight/weight)
818.	*(954)*	Hexafluoroacetone	684-16-2	1
819.	*(955)*	Hexafluoroacetone hydrate	10543-95-0	1
820.	*(91)*	Hexafluorophosphoric acid	16940-81-1	1
821.	*(958)*	Hexakis(methoxymethyl)melamine	3089-11-0	1
822.	*(963)*	Hexamethyl phosphoramide	680-31-9	0.1
823.	*(959)*	Hexamethylenediamine	124-09-4	1
824.	*(960)*	Hexamethylenediisocyanate	822-06-0	0.1
825.	*(961)*	Hexamethylenimine	111-49-9	1
826.	*(962)*	Hexamethylolmelamine	531-18-0	1
827.	*(964)*	Hexane, all isomers	—	1
828.	*(965)*	*n*-Hexane	110-54-3	1
829.	*(966)*	Hexanitrodiphenylamine	35860-31-2	1
830.	*(92)*	Hexanoic acid	142-62-1	1
831.	*(968)*	2-Hexanone	591-78-6	1
832.	*(176)*	*n*-Hexyl alcohol	111-27-3	1
833.	*(177)*	*sec*-Hexyl alcohol	97-95-0	1
834.	*(18)*	*n*-Hexyl acetate	142-92-7	1
835.	*(19)*	*sec*-Hexyl acetate	108-84-9	1
836.	*(969)*	*n*-Hexylamine	111-26-2	1
837.	*(970)*	Hexylene glycol	107-41-5	1
838.	*(843)*	*n*-Hexyl ether	112-58-3	1
839.	*(1093)*	Hexylmethacrylate	142-09-6	1
840.	*(971)*	Hexyltrichlorosilane	928-65-4	1
841.	*(978)*	Hydrazine	302-01-2	0.1
842.	*(979)*	Hydrazobenzene	122-66-7	0.1
843.	*(93)*	Hydrazoic acid	7782-79-8	1
844.	*(338)*	Hydrogen bromide	10035-10-6	1
845.	*(502)*	Hydrogen chloride	7647-01-0	1
846.	*(593)*	Hydrogen cyanide	74-90-8	1
847.	*(906)*	Hydrogen fluoride	7664-39-3	1
848.	*(1025)*	Hydrogen iodide	10034-85-2	1
849.	*(1365)*	Hydrogen peroxide	7722-84-1	1
850.	*(1480)*	Hydrogen selenide	7783-07-5	0.1
851.	*(1550)*	Hydrogen sulfide	7783-06-4	1
852.	*(983)*	Hydroquinone	123-31-9	1
853.	*(842)*	Hydroquinone, dimethyl ether	150-78-7	1
854.	*(94)*	Hydroxyacetic acid	79-14-1	1
855.	*(988)*	2-Hydroxydecalin	825-51-4	1
856.	*(1064)*	Hydroxydecanoic acid, *gamma*-lactone	706-14-9	1
857.	*(159)*	Hydroxyethyl acrylate	818-61-1	1
858.	*(383)*	*beta*-Hydroxyethylcarbamate	5395-01-7	1
859.	*(1094)*	2-Hydroxyethyl methacrylate	868-77-9	1
860.	*(1065)*	4-Hydroxyheptanoic acid,*gamma*-lactone	105-21-5	1
861.	*(1003)*	Hydroxylamine	7803-49-8	1
862.	*(1523)*	Hydroxylamine sulphate	10039-54-0	1
863.	*(1004)*	4-Hydroxy-3-nitroaniline	119-34-6	1
864.	*(1066)*	4-Hydroxyoctanoic acid lactone	104-50-7	1
865.	*(160)*	2-Hydroxypropyl acrylate	999-61-1	1
866.	*(1006)*	8-Hydroxyquinoline	148-24-3	1
867.	*(1008)*	3-Hydroxy-4-(2,4-xylylazo)-2,7-naphthalenedisulfonic acid, disodium salt	3761-53-3	1
868.	*(1014)*	3,3'-Iminobispropylamine	56-18-8	1
869.	*(1015)*	Indan	496-11-7	1
870.	*(1016)*	Indene	95-13-6	1
871.	*(1017)*	Indeno(1,2,3-*cd*)pyrene	193-39-5	0.1
872.	*(1018)*	Indium compounds, *n.o.s.****	—	1
873.	*(1019)*	Indium, elemental	7440-74-6	1
874.	*(1206)*	Indium nitrate	13770-61-1	1
875.	*(1020)*	Iodine	7553-56-2	1
876.	*(1169)*	Iodine monochloride	7790-99-0	1
877.	*(1021)*	2-Iodoacetamide	144-48-9	1
878.	*(1580)*	Iridium tetrachloride	10025-97-5	1
879.	*(1311)*	Iron manganese zinc oxide	12645-49-7	0.1
880.	*(1312)*	Iron nickel zinc oxide	12645-50-0	0.1
881.	*(879)*	Iron pentacarbonyl	13463-40-6	1
882.	*(883)*	Iron, water-soluble salts, *n.o.s.****	—	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
883.	*(20)*	Isoamyl acetate	123-92-2	1
884.	*(178)*	Isoamyl alcohol	123-51-3	1
885.	*(374)*	Isoamyl butyrate	106-27-4	1
886.	*(1610)*	Isobornyl thiocyanoacetate	115-31-1	1
887.	*(1032)*	Isobutanol	78-83-1	1
888.	*(21)*	Isobutyl acetate	110-19-0	1
889.	*(1041)*	Isobutyl isocyanate	1873-29-6	0.1
890.	*(1033)*	Isobutyraldehyde	78-84-2	1
891.	*(95)*	Isobutyric acid	79-31-2	1
892.	*(230)*	Isobutyric anhydride	97-72-3	1
893.	*(503)*	Isobutyryl chloride	79-30-1	1
894.	*(916)*	Isocyanatobenzotrifluorides	—	1
895.	*(96)*	Isocyanuric acid	108-80-5	1
896.	*(179)*	Isooctyl alcohol	26952-21-6	1
897.	*(97)*	Isopentanoic acid	503-74-2	1
898.	*(1047)*	Isophorone	78-59-1	1
899.	*(1048)*	Isophorone diamine	2855-13-2	1
900.	*(718)*	Isophorone diisocyanate	4098-71-9	0.1
901.	*(98)*	Isophthalic acid	121-91-5	1
902.	*(504)*	Isophthaloyl chloride	99-63-8	1
903.	*(1049)*	Isoprene	78-79-5	1
904.	*(1050)*	Isopropanol	67-63-0	1
905.	*(1051)*	Isopropanolamine	78-96-6	1
906.	*(22)*	Isopropyl acetate	108-21-4	1
907.	*(1052)*	Isopropylamine	75-31-0	1
908.	*(1053)*	2-Isopropyl aniline	643-28-7	1
909.	*(1054)*	Isopropylbenzene	98-82-8	1
910.	*(438)*	Isopropyl chloroformate	108-23-6	1
911.	*(844)*	Isopropyl ether	108-20-3	1
912.	*(826)*	Isopropyl glycidyl ether	4016-14-2	1
913.	*(1042)*	Isopropyl isocyanate	1795-48-8	0.1
914.	*(1102)*	Isopropyl methane sulphonate	926-06-7	0.1
915.	*(1368)*	Isopropyl peroxydicarbonate	105-64-6	1
916.	*(1055)*	*N*-Isopropyl-*N'*-phenyl-*p*-phenylene-diamine	101-72-4	1
917.	*(99)*	Isopropyl phosphoric acid	1623-24-1	1
918.	*(1056)*	Isoquinoline	119-65-3	1
919.	*(1058)*	Jasmone	488-10-8	1
920.	*(397)*	Ketene	463-51-4	1
921.	*(100)*	Lactic acid	50-21-5	1
922.	*(1207)*	Lanthanum nitrate	10099-59-9	1
923.	*(1366)*	Lauroyl peroxide	105-74-8	1
924.	*(180)*	Lauryl alcohol	112-53-8	1
925.	*(189)*	Lauryl aldehyde	112-54-9	1
926.	*(1067)*	Lauryldimethylamine	112-18-5	1
927.	*(1313)*	Lauryldimethylamine oxide	1643-20-5	1
928.	*(1095)*	Lauryl methacrylate	142-90-5	1
929.	*(30)*	Lead acetate	301-04-2	0.1
930.	*(31)*	Lead acetate, basic	1335-32-6	0.1
931.	*(262)*	Lead arsenate	7784-40-9	1
932.	*(389)*	Lead carbonate	598-63-0	0.1
933.	*(521)*	Lead chloride	7758-95-4	0.1
934.	*(550)*	Lead chromate	7758-97-6	0.1
935.	*(556)*	Lead chromate oxide	18454-12-1	0.1
936.	*(740)*	Lead dimethyldithiocarbamate	19010-66-3	1
937.	*(1435)*	Lead, elemental	7439-92-1	0.1
938.	*(889)*	Lead fluoborate	13814-96-5	1
939.	*(898)*	Lead fluorosilicate	25808-74-6	1
940.	*(1434)*	Lead, inorganic compounds, n.o.s.***	—	1
941.	*(1175)*	Lead monoxide	1317-36-8	1
942.	*(1183)*	Lead naphthenate	61790-14-5	1
943.	*(1209)*	Lead nitrate	10099-74-8	0.1
944.	*(1394)*	Lead phosphate	7446-27-7	0.1
945.	*(1528)*	Lead sulfate	7446-14-2	1
946.	*(974)*	Lemongrass oil	8007-02-1	1
947.	*(101)*	Levulinic acid	123-76-2	1
948.	*(1068)*	*d*-Limonene	5989-27-5	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
949.	(*1069*)	*l*-Limonene	5989-54-8	1
950.	(*102*)	Linoleic acid	60-33-3	1
951.	(*975*)	Linseed oil	8001-26-1	1
952.	(*1009*)	Lithium aluminum hydride	16853-85-3	1
953.	(*1638*)	Lithium aluminum tri-*tert*-butoxy- hydride	17476-04-9	1
954.	(*907*)	Lithium fluoride	7789-24-4	1
955.	(*1010*)	Lithium hydride	7580-67-8	1
956.	(*993*)	Lithium hydroxide	1310-65-2	1
957.	(*261*)	Magnesium arsenate	10103-50-1	1
958.	(*908*)	Magnesium fluoride	7783-40-6	1
959.	(*1314*)	Magnesium oxide	1309-48-4	1
960.	(*1411*)	Magnesium phosphide	12057-74-8	1
961.	(*1715*)	Malachite green	569-64-2	1
962.	(*103*)	Maleic acid	110-16-7	1
963.	(*869*)	Maleic acid *N*-ethylimide	128-53-0	1
964.	(*231*)	Maleic anhydride	108-31-6	0.1
965.	(*104*)	Malic acid	6915-15-7	1
966.	(*1071*)	Malonaldehyde	542-78-9	1
967.	(*1073*)	Malononitrile	109-77-3	1
968.	(*1074*)	Mandelonitrile	532-28-5	1
969.	(*23*)	Manganese(II) acetate	638-38-0	1
970.	(*387*)	Manganese carbonate	598-62-9	0.1
971.	(*505*)	Manganese(II) chloride	7773-01-5	0.1
972.	(*1075*)	Manganese compounds, n.o.s.***	—	1
973.	(*1076*)	Manganese cyclopentadienyl tricarbonyl	12079-65-1	1
974.	(*1077*)	Manganese, elemental	7439-96-5	1
975.	(*1524*)	Manganese(II) sulfate	7785-87-7	1
976.	(*1081*)	Melamine	108-78-1	1
977.	(*36*)	Mercuric acetate	1600-27-7	0.1
978.	(*506*)	Mercuric ammonium chloride	10124-48-8	1
979.	(*345*)	Mercuric bromide	7789-47-1	1
980.	(*544*)	Mercuric chloride	7487-94-7	0.1
981.	(*598*)	Mercuric cyanide	592-04-1	1
982.	(*1031*)	Mercuric iodide	7774-29-0	0.1
983.	(*1216*)	Mercuric nitrate	10045-94-0	1
984.	(*1328*)	Mercuric oxide	21908-53-2	0.1
985.	(*1537*)	Mercuric sulfate	7783-35-9	1
986.	(*1609*)	Mercuric thiocyanate	592-85-8	1
987.	(*543*)	Mercurous chloride	7546-30-7	1
988.	(*1215*)	Mercurous nitrate	10415-75-5	1
989.	(*1079*)	Mercury compounds, n.o.s.***	—	1
990.	(*1080*)	Mercury, elemental	7439-97-6	0.1
991.	(*1315*)	Mesityl oxide	141-79-7	1
992.	(*105*)	Metanilic acid	121-47-1	1
993.	(*1087*)	Methacrylaldehyde	78-85-3	1
994.	(*106*)	Methacrylic acid	79-41-4	1
995.	(*1091*)	Methacrylic acid, ethyl ester	97-63-2	0.1
996.	(*1100*)	*gamma*-Methacryloxypropyltrimethoxy-silane	2530-85-0	1
997.	(*1104*)	Methenamine	100-97-0	0.1
998.	(*1105*)	2-Methoxy-1,4-benzenediamine	5307-02-8	1
999.	(*1106*)	2-Methoxyethanol	109-86-4	0.1
1000.	(*24*)	2-Methoxyethyl acetate	110-49-6	0.1
1001.	(*1043*)	Methoxymethyl isocyanate	6427-21-0	0.1
1002.	(*1107*)	*p*-Methoxyphenol	150-76-5	1
1003.	(*1*)	Methyl abietate	127-25-3	1
1004.	(*26*)	Methyl acetate	79-20-9	1
1005.	(*39*)	Methylacetoacetate	105-45-3	1
1006.	(*1108*)	Methyl acetylene	74-99-7	1
1007.	(*1109*)	2-Methylacrylamide	79-39-0	1
1008.	(*1110*)	*N*-Methylacrylamide	1187-59-3	0.1
1009.	(*161*)	Methyl acrylate	96-33-3	1
1010.	(*1099*)	Methyl acrylonitrile	126-98-7	1
1011.	(*1111*)	Methylal	109-87-5	1
1012.	(*183*)	Methyl alcohol	67-56-1	1
1013.	(*1112*)	Methylamine	74-89-5	0.1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1014.	(*1113*)	1-Methylamino-4-ethanolaminoanthraquinone	2475-46-9	1
1015.	(*1114*)	Methyl amyl ketone	110-43-0	1
1016.	(*1115*)	Methyl *n*-amyl ketone	110-43-0	1
1017.	(*1116*)	*N*-Methylaniline	100-61-8	1
1018.	(*25*)	Methylazoxymethyl acetate	592-62-1	1
1019.	(*1117*)	2-Methyl-1,4-benzoquinone	553-97-9	1
1020.	(*182*)	*alpha*-Methylbenzyl alcohol	98-85-1	1
1021.	(*1118*)	1-Methyl-2-benzylhydrazine	10309-79-2	0.1
1022.	(*1119*)	*N*-Methyl-bis(2-chloroethyl)amine	51-75-2	1
1023.	(*323*)	Methyl bromoacetate	96-32-2	1
1024.	(*1120*)	3-Methyl-2-butanone	563-80-4	1
1025.	(*1121*)	*N*-Methylbutylamine	110-68-9	1
1026.	(*375*)	Methyl butyrate	623-42-7	1
1027.	(*507*)	Methyl chloride	74-87-3	1
1028.	(*420*)	Methyl chlorocarbonate	79-22-1	1
1029.	(*827*)	Methyl chloromethyl ether	107-30-2	0.1
1030.	(*1122*)	Methylchlorosilane	993-00-0	1
1031.	(*1123*)	3-Methylcholanthrene	56-49-5	0.1
1032.	(*1124*)	5-Methylchrysene	3697-24-3	1
1033.	(*585*)	Methyl cyanoacrylate	137-05-3	1
1034.	(*1125*)	Methylcyclohexane	108-87-2	1
1035.	(*1126*)	Methylcyclohexanol	25639-42-3	1
1036.	(*1127*)	2-Methylcyclohexanone	583-60-8	1
1037.	(*1078*)	Methyl cyclopentadienyl manganese tricarbonyl	12108-13-3	1
1038.	(*1128*)	Methyl dichlorosilane	75-54-7	1
1039.	(*1129*)	4,4′-Methylenebis(2-chloroaniline)	101-14-4	0.1
1040.	(*1131*)	Methylene bis-(4-cyclohexylisocyanate)	5124-30-1	0.1
1041.	(*1130*)	4,4′-Methylenebis(*N*,*N*-dimethyl)-benzenamine	101-61-1	0.1
1042.	(*1132*)	2,2′-Methylenebis(4-methyl-6-*tert*-butylphenol)	119-47-1	1
1043.	(*311*)	Methylene blue	61-73-4	1
1044.	(*508*)	Methylene chloride	75-09-2	0.1
1045.	(*1133*)	Methyl ethyl ketone	78-93-3	1
1046.	(*1367*)	Methyl ethyl ketone peroxide	1338-23-4	1
1047.	(*1134*)	2-Methyl-5-ethylpyridine	104-90-5	1
1048.	(*923*)	Methyl formate	107-31-3	1
1049.	(*1135*)	Methylfuran	534-22-5	1
1050.	(*928*)	Methyl-2-furoate	611-13-2	1
1051.	(*1136*)	5-Methylhexan-2-one	110-12-3	1
1052.	(*1137*)	Methylhydrazine	60-34-4	0.1
1053.	(*1026*)	Methyl iodide	74-88-4	0.1
1054.	(*1138*)	Methyl isobutyl carbinol	108-11-2	1
1055.	(*1139*)	Methyl isobutyl ketone	108-10-1	1
1056.	(*1044*)	Methyl isocyanate	624-83-9	0.1
1057.	(*1140*)	Methyl isopropenyl ketone	814-78-8	1
1058.	(*1142*)	Methyl mercaptan	74-93-1	1
1059.	(*1096*)	Methyl methacrylate	80-62-6	1
1060.	(*1103*)	Methyl methane sulfonate	66-27-3	1
1061.	(*1143*)	Methylmorpholine	109-02-4	1
1062.	(*1144*)	Methylnaphthalene	1321-94-4	1
1063.	(*1145*)	*N*-Methyl-*N*′-nitro-*N*-nitrosoguanidine	70-25-7	0.1
1064.	(*1147*)	3-Methyl-3-octanol	5340-36-3	1
1065.	(*1290*)	Methyl orthoformate	149-73-5	1
1066.	(*1148*)	2-Methylpentane	107-83-5	1
1067.	(*1149*)	2-Methyl-1-pentanol	105-30-6	1
1068.	(*1150*)	Methylphenyldichlorosilane	149-74-6	1
1069.	(*1151*)	3-Methyl-1-phenyl-2-pyrazolin-5-one	89-25-8	1
1070.	(*510*)	Methyl phosphonothioic dichloride	676-98-2	1
1071.	(*509*)	Methyl phosphonous dichloride	676-83-5	1
1072.	(*619*)	2-Methyl-2-propene-1,1-diol diacetate	10476-95-6	1
1073.	(*1449*)	Methyl propionate	554-12-1	1
1074.	(*1152*)	Methyl propyl ketone	107-87-9	1
1075.	(*1474*)	Methyl salicylate	119-36-8	0.1
1076.	(*1481*)	Methyl selenide	593-79-3	1
1077.	(*1486*)	Methyl silicate	681-84-5	1
1078.	(*1153*)	*alpha*-Methylstyrene	98-83-9	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1079.	(*1154*)	Methyltetrahydrofuran	96-47-9	1
1080.	(*1631*)	Methyl-*p*-toluenesulfonate	80-48-8	1
1081.	(*1155*)	Methyltrichlorosilane	75-79-6	1
1082.	(*1156*)	Methyltriethoxysilane	2031-67-6	1
1083.	(*1157*)	Methyltrimethoxysilane	1185-55-3	1
1084.	(*1705*)	Methyl undecylenate	5760-50-9	1
1085.	(*1158*)	Methyl vinyl ketone	78-94-4	1
1086.	(*1159*)	2-Methyl-5-vinylpyridine	140-76-1	1
1087.	(*1720*)	Methyl violet	1325-82-2	1
1088.	(*1160*)	Mica	12001-26-2	1
1089.	(*398*)	Michler's ketone	90-94-8	0.1
1090.	(*1288*)	Molybdate orange	12656-85-8	0.1
1091.	(*1166*)	Molybdenum compounds, n.o.s.***	—	1
1092.	(*1167*)	Molybdenum, elemental	7439-98-7	1
1093.	(*1694*)	Molybdenum trioxide	1313-27-5	1
1094.	(*1656*)	Monobutyltin trichloride	1118-46-3	1
1095.	(*1168*)	Monochloroacetone	78-95-5	1
1096.	(*1170*)	Monoethanolamine	141-43-5	1
1097.	(*107*)	Monofluorophosphoric acid	13537-32-1	1
1098.	(*1171*)	Mononitro-*m*-toluidine	—	1
1099.	(*1172*)	Mononitro-*o*-toluidine	—	1
1100.	(*1173*)	Mononitro-*p*-toluidine	—	1
1101.	(*1177*)	Morpholine	110-91-8	1
1102.	(*1178*)	Morpholine ethanol	622-40-2	1
1103.	(*1730*)	Mustard gas (bis(2-chloroethyl)-sulfide)	505-60-2	0.1
1104.	(*1179*)	Myrcene	123-35-3	0.1
1105.	(*108*)	Myristic acid	544-63-8	1
1106.	(*184*)	Myristic alcohol	112-72-1	1
1107.	(*190*)	Myristic aldehyde	5780-07-4	1
1108.	(*1181*)	Naphthalene	91-20-3	1
1109.	(*1184*)	*alpha*-Naphthol	90-15-3	1
1110.	(*1185*)	*beta*-Naphthol	135-19-3	1
1111.	(*828*)	*beta*-Naphthol ethyl ether	93-18-5	1
1112.	(*1186*)	*alpha*-Naphthylamine	134-32-7	1
1113.	(*1187*)	*beta*-Naphthylamine	91-59-8	0.1
1114.	(*109*)	1-Naphthylamine-6-sulfonic acid	119-79-9	1
1115.	(*1146*)	1-Naphthyl methylnitrosocarbonate	7090-25-7	1
1116.	(*1188*)	2-(1-Naphthyl)thioacetamide	17518-47-7	1
1117.	(*1061*)	Natural yellow 10	117-39-5	1
1118.	(*1189*)	Neohexane	75-83-2	1
1119.	(*620*)	Neopentyl glycol diacrylate	2223-82-7	1
1120.	(*27*)	Nickel(II) acetate	373-02-4	0.1
1121.	(*1526*)	Nickel(II) ammonium sulfate	15699-18-0	0.1
1122.	(*388*)	Nickel(II) carbonate	3333-67-3	0.1
1123.	(*1190*)	Nickel carbonyl	13463-39-3	0.1
1124.	(*511*)	Nickel(II) chloride	7718-54-9	0.1
1125.	(*594*)	Nickel cyanide	557-19-7	1
1126.	(*1193*)	Nickel, elemental	7440-02-0	0.1
1127.	(*888*)	Nickel(II) fluoborate	14708-14-6	1
1128.	(*917*)	Nickel(II) fluosilicate	26043-11-8	1
1129.	(*924*)	Nickel formate	15843-02-4	0.1
1130.	(*994*)	Nickel(II) hydroxide	12054-48-7	0.1
1131.	(*1027*)	Nickel(II) iodide	13462-90-3	0.1
1132.	(*1208*)	Nickel(II) nitrate	13138-45-9	0.1
1133.	(*1194*)	Nickelocene	1271-28-9	0.1
1134.	(*1316*)	Nickel(II) oxide	1313-99-1	0.1
1135.	(*1317*)	Nickel(III) oxide	1314-06-3	1
1136.	(*1355*)	Nickel perchlorate	13637-71-3	0.1
1137.	(*595*)	Nickel potassium cyanide	14220-17-8	0.1
1138.	(*1501*)	Nickel subsulfide	12035-72-2	0.1
1139.	(*1525*)	Nickel(II) sulfate	7786-81-4	0.1
1140.	(*1551*)	Nickel(II) sulfide	11113-75-0	0.1
1141.	(*1560*)	Nickel telluride	12142-88-0	0.1
1142.	(*1318*)	Nickel titanium oxide	12035-39-1	0.1
1143.	(*1192*)	Nickel, water-insoluble compounds, n.o.s.***	—	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I		Column II
		Ingredient		
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1144.	*(1191)*	Nickel, water-soluble inorganic compounds, n.o.s.***	—	1
1145.	*(1195)*	Nicotine	54-11-5	1
1146.	*(111)*	Nitric acid	7697-37-2	1
1147.	*(1330)*	Nitric oxide	10102-43-9	1
1148.	*(110)*	Nitrilotriacetic acid	139-13-9	0.1
1149.	*(1219)*	5-Nitroacenaphthene	602-87-9	1
1150.	*(1220)*	*m*-Nitroaniline	99-09-2	1
1151.	*(1221)*	*o*-Nitroaniline	88-74-4	1
1152.	*(1222)*	*p*-Nitroaniline	100-01-6	1
1153.	*(1223)*	5-Nitro-*o*-anisidine	99-59-2	0.1
1154.	*(1224)*	2-Nitroanisole	91-23-6	1
1155.	*(1225)*	3-Nitroanisole	555-03-3	1
1156.	*(1226)*	4-Nitroanisole	100-17-4	1
1157.	*(1227)*	Nitrobenzene	98-95-3	1
1158.	*(112)*	Nitrobenzenesulphonic acid	31212-28-9	1
1159.	*(113)*	*m*-Nitrobenzenesulfonic acid	98-47-5	1
1160.	*(114)*	*m*-Nitrobenzenesulfonic acid, sodium salt	127-68-4	1
1161.	*(115)*	*p*-Nitrobenzoic acid	62-23-7	1
1162.	*(1228)*	*m*-Nitrobenzotrifluoride	98-46-4	1
1163.	*(1229)*	*o*-Nitrobenzotrifluoride	384-22-5	1
1164.	*(1230)*	*p*-Nitrobenzotrifluoride	402-54-0	1
1165.	*(1231)*	4-Nitrobiphenyl	92-93-3	0.1
1166.	*(1232)*	*m*-Nitrobromobenzene	585-79-5	1
1167.	*(1233)*	*o*-Nitrobromobenzene	577-19-5	1
1168.	*(1234)*	*p*-Nitrobromobenzene	586-78-7	1
1169.	*(1235)*	*m*-Nitrochlorobenzene	121-73-3	1
1170.	*(1236)*	*o*-Nitrochlorobenzene	88-73-3	1
1171.	*(1237)*	*p*-Nitrochlorobenzene	100-00-5	1
1172.	*(1238)*	3-Nitro-4-chlorobenzotrifluoride	121-17-5	1
1173.	*(1239)*	*p*-Nitrodiphenylamine	836-30-6	1
1174.	*(1240)*	Nitroethane	79-24-3	1
1175.	*(769)*	Nitrogen dioxide	10102-44-0	1
1176.	*(1602)*	Nitrogen tetroxide	10544-72-6	1
1177.	*(1673)*	Nitrogen trifluoride	7783-54-2	1
1178.	*(1693)*	Nitrogen trioxide	10544-73-7	1
1179.	*(1241)*	1-Nitroguanidine	556-88-7	1
1180.	*(116)*	Nitrohydrochloric acid (aqua regia)	8007-56-5	1
1181.	*(1242)*	Nitromethane	75-52-5	1
1182.	*(1243)*	4-Nitrophenetole	100-29-8	1
1183.	*(1244)*	*m*-Nitrophenol	554-84-7	1
1184.	*(1245)*	*o*-Nitrophenol	88-75-5	1
1185.	*(1246)*	*p*-Nitrophenol	100-02-7	1
1186.	*(1247)*	1-Nitropropane	108-03-2	1
1187.	*(1248)*	2-Nitropropane	79-46-9	0.1
1188.	*(1249)*	4-Nitroquinoline-1-oxide	56-57-5	1
1189.	*(1250)*	*N*-Nitrosodibutylamine	924-16-3	0.1
1190.	*(1251)*	*N*-Nitrosodiethanolamine	1116-54-7	0.1
1191.	*(1252)*	*N*-Nitrosodiethylamine	55-18-5	0.1
1192.	*(1253)*	*N*-Nitrosodimethylamine	62-75-9	0.1
1193.	*(1254)*	*N*-Nitrosodiphenylamine	86-30-6	0.1
1194.	*(1255)*	*p*-Nitrosodiphenylamine	156-10-5	1
1195.	*(1256)*	*N*-Nitrosodipropylamine	621-64-7	0.1
1196.	*(1257)*	*N*-Nitroso-*N*-ethylurea	759-73-9	0.1
1197.	*(1258)*	*N*-Nitroso-*N*-methylurea	684-93-5	0.1
1198.	*(1259)*	Nitrosomethylurethane	615-53-2	1
1199.	*(1260)*	*N*-Nitrosomethylvinylamine	4549-40-0	0.1
1200.	*(1261)*	*N*-Nitrosomorpholine	59-89-2	0.1
1201.	*(1262)*	*N'*-Nitrosonornicotine	16543-55-8	0.1
1202.	*(1263)*	*N*-Nitrosopiperidine	100-75-4	0.1
1203.	*(1264)*	*N*-Nitrosopyrrolidine	930-55-2	0.1
1204.	*(1265)*	*N*-Nitrososarcosine	13256-22-9	0.1
1205.	*(512)*	Nitrosyl chloride	2696-92-6	1
1206.	*(117)*	Nitrosylsulphuric acid	7782-78-7	1
1207.	*(1266)*	*m*-Nitrotoluene	99-08-1	1
1208.	*(1267)*	*o*-Nitrotoluene	88-72-2	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1209.	(*1268*)	*p*-Nitrotoluene	99-99-0	1
1210.	(*1269*)	5-Nitro-*o*-toluidine	99-55-8	1
1211.	(*1329*)	Nitrous oxide	10024-97-2	0.1
1212.	(*1270*)	Nitroxylene, all isomers	—	1
1213.	(*1274*)	Nonane	111-84-2	1
1214.	(*1276*)	Nonyl phenol	25154-52-3	1
1215.	(*1277*)	Nonyltrichlorosilane	5283-67-0	1
1216.	(*1278*)	Octachloronaphthalene	2234-13-1	1
1217.	(*1279*)	*n*-Octadecylamine	124-30-1	1
1218.	(*1280*)	Octadecyltrichlorosilane	112-04-9	1
1219.	(*1281*)	Octane	111-65-9	1
1220.	(*118*)	Octanoic acid	124-07-2	1
1221.	(*1282*)	3-Octanol	589-98-0	1
1222.	(*1283*)	*gamma*-*n*-Octyl-*gamma*-*n*-butyrolactone	2305-05-7	1
1223.	(*1284*)	Octyl trichlorosilane	5283-66-9	1
1224.	(*977*)	Oil, mineral	8012-95-1	1
1225.	(*119*)	Oleic acid	112-80-1	1
1226.	(*1599*)	Osmium, tetraaminetetrachloro-	—	1
1227.	(*1603*)	Osmium tetroxide	20816-12-0	0.1
1228.	(*120*)	Oxalic acid	144-62-7	0.1
1229.	(*1294*)	Oxamide	471-46-5	1
1230.	(*1295*)	Oxybis(dibutyl(2,4,5-trichlorophenoxy)tin)	74007-80-0	1
1231.	(*710*)	Oxygen difluoride	7783-41-7	1
1232.	(*1332*)	Ozone	10028-15-6	1
1233.	(*513*)	Palladium(II) chloride	7647-10-1	1
1234.	(*750*)	Palladium dinitrate	10102-05-3	1
1235.	(*1333*)	Paraformaldehyde	30525-89-4	1
1236.	(*1334*)	Paraldehyde	123-63-7	0.1
1237.	(*1335*)	Pararosaniline hydrochloride	569-61-9	1
1238.	(*121*)	Pelargonic acid	112-05-0	1
1239.	(*1336*)	Pentaborane	19624-22-7	1
1240.	(*1338*)	Pentachloroethane	76-01-7	1
1241.	(*1339*)	Pentachloronaphthalene	1321-64-8	1
1242.	(*1340*)	Pentachlorothiophenol	133-49-3	1
1243.	(*1348*)	Pentane	109-66-0	1
1244.	(*1349*)	2,4-Pentanedione	123-54-6	1
1245.	(*28*)	Pentyl acetate	628-63-7	1
1246.	(*1353*)	*p*-*tert*-Pentylphenol	80-46-6	1
1247.	(*1354*)	Perchlorate compounds, n.o.s.***	—	1
1248.	(*122*)	Perchloric acid	7601-90-3	1
1249.	(*1356*)	Perchloroethylene	127-18-4	1
1250.	(*1357*)	Perchloromethyl mercaptan	594-42-3	1
1251.	(*909*)	Perchloryl fluoride	7616-94-6	1
1252.	(*1358*)	Perilla alcohol	536-59-4	1
1253.	(*123*)	Peroxyacetic acid	79-21-0	1
1254.	(*1369*)	Persulfate compounds	—	0.1
1255.	(*1370*)	Perylene	198-55-0	1
1256.	(*339*)	Phenacyl bromide	70-11-1	1
1257.	(*1371*)	Phenanthrene	85-01-8	1
1258.	(*185*)	Phenethyl alcohol	60-12-8	1
1259.	(*1372*)	*o*-Phenetidine	94-70-2	1
1260.	(*1373*)	*p*-Phenetidine	156-43-4	1
1261.	(*1374*)	Phenol	108-95-2	1
1262.	(*124*)	Phenolsulphonic acid	1333-39-7	1
1263.	(*1376*)	Phenothiazine	92-84-2	1
1264.	(*1377*)	Phenylacetonitrile	140-29-4	1
1265.	(*516*)	Phenylacetyl chloride	103-80-0	1
1266.	(*125*)	Phenylarsonic acid	98-05-5	1
1267.	(*517*)	Phenylcarbylamine chloride	622-44-6	1
1268.	(*439*)	Phenyl chloroformate	1885-14-9	1
1269.	(*1378*)	*N*-Phenyl diethanolamine	120-07-0	1
1270.	(*784*)	Phenyl diselenide	1666-13-3	1
1271.	(*1379*)	*m*-Phenylenediamine	108-45-2	0.1
1272.	(*1380*)	*o*-Phenylenediamine	95-54-5	0.1
1273.	(*1381*)	*p*-Phenylenediamine	106-50-3	0.1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1274.	(*1382*)	*N*-Phenyl ethanolamine	122-98-5	1
1275.	(*829*)	Phenyl glycidyl ether	122-60-1	0.1
1276.	(*1383*)	Phenylhydrazine	100-63-0	0.1
1277.	(*1045*)	Phenyl isocyanate	103-71-9	0.1
1278.	(*1384*)	Phenyl mercaptan	108-98-5	1
1279.	(*29*)	Phenylmercuric acetate	62-38-4	0.1
1280.	(*995*)	Phenylmercuric hydroxide	100-57-2	1
1281.	(*1385*)	*N*-Phenyl-*beta*-naphthylamine	135-88-6	0.1
1282.	(*1386*)	*o*-Phenylphenol	90-43-7	1
1283.	(*1387*)	Phenylphosphine	638-21-1	1
1284.	(*518*)	Phenyl phosphorus dichloride	644-97-3	1
1285.	(*1612*)	Phenyl phosphorus thiodichloride	3497-00-5	1
1286.	(*1552*)	Phenyl sulfide	139-66-2	1
1287.	(*1388*)	1-Phenyl-2-thiourea	103-85-5	1
1288.	(*1389*)	Phenyltrichlorosilane	98-13-5	1
1289.	(*1390*)	Phosgene	75-44-5	1
1290.	(*1402*)	Phosphine	7803-51-2	1
1291.	(*127*)	Phosphoric acid	7664-38-2	1
1292.	(*1401*)	Phosphoric acid, bis(2-ethylhexyl) ester, sodium salt	141-65-1	1
1293.	(*232*)	Phosphoric anhydride	1314-56-3	1
1294.	(*126*)	Phosphorous acid	13598-36-2	1
1295.	(*1407*)	Phosphorus	7723-14-0	1
1296.	(*1296*)	Phosphorus oxybromide	7789-59-5	1
1297.	(*1297*)	Phosphorus oxycloride	10025-87-3	1
1298.	(*1337*)	Phosphorus pentabromide	7789-69-7	1
1299.	(*1341*)	Phosphorus pentachloride	10026-13-8	1
1300.	(*1346*)	Phosphorus pentafluoride	7647-19-0	1
1301.	(*1350*)	Phosphorus pentasulfide	1314-80-3	1
1302.	(*1637*)	Phosphorus tribromide	7789-60-8	1
1303.	(*1658*)	Phosphorus trichloride	7719-12-2	1
1304.	(*1679*)	Phosphorus trifluoride	7783-55-3	1
1305.	(*1695*)	Phosphorus trioxide	1314-24-5	1
1306.	(*233*)	Phthalic anhydride	85-44-9	0.1
1307.	(*1424*)	*m*-Phthalodinitrile	626-17-5	1
1308.	(*1425*)	*o*-Picoline	109-06-8	1
1309.	(*1426*)	*p*-Picoline	108-89-4	1
1310.	(*128*)	Picric acid	88-89-1	1
1311.	(*1427*)	Pinacol	76-09-5	1
1312.	(*1428*)	*alpha*-Pinene	80-56-8	1
1313.	(*1429*)	*beta*-Pinene	127-91-3	1
1314.	(*1430*)	Piperazine	110-85-0	0.1
1315.	(*1431*)	Piperazine hydrochloride	142-64-3	0.1
1316.	(*519*)	Pivaloyl chloride	3282-30-2	1
1317.	(*520*)	Platinum(II) chloride	10025-65-7	0.1
1318.	(*1432*)	Platinum, elemental	7440-06-4	1
1319.	(*1527*)	Platinum(II) sulfate	53231-79-1	0.1
1320.	(*1581*)	Platinum(IV) tetrachloride	13454-96-1	0.1
1321.	(*1433*)	Platinum, water-soluble salts, n.o.s.***	—	0.1
1322.	(*1439*)	Polybrominated biphenyls (PBB)	67774-32-7	0.1
1323.	(*1440*)	Polychlorinated biphenyls (PCB)	1336-36-3	0.1
1324.	(*830*)	Polyethylene glycol monooleyl ether	9004-98-2	1
1325.	(*831*)	Polyethylene glycol octylphenol ether	9002-93-1	1
1326.	(*832*)	Polyethylene glycol octylphenyl ether	9036-19-5	1
1327.	(*1503*)	Polyethylene glycol stearate	9004-99-3	1
1328.	(*340*)	Potassium bromide	7758-02-3	0.1
1329.	(*390*)	Potassium carbonate	584-08-7	1
1330.	(*551*)	Potassium chromate	7789-00-6	1
1331.	(*687*)	Potassium dichromate	7778-50-9	0.1
1332.	(*264*)	Potassium dihydrogen arsenate	7784-41-0	1
1333.	(*952*)	Potassium hexachloroplatinate(IV)	16921-30-5	0.1
1334.	(*1513*)	Potassium hydrogen sulfate	7646-93-7	1
1335.	(*996*)	Potassium hydroxide	1310-58-3	1
1336.	(*1012*)	Potassium hypochlorite	7778-66-7	1
1337.	(*1028*)	Potassium iodide	7681-11-0	1
1338.	(*1082*)	Potassium metabisulfite	16731-55-8	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1339.	(*1217*)	Potassium nitrite	7758-09-0	0.1
1340.	(*448*)	Potassium palladium chloride	10025-98-6	1
1341.	(*1359*)	Potassium permanganate	7722-64-7	1
1342.	(*1412*)	Potassium phosphide	20770-41-6	1
1343.	(*1476*)	Potassium selenate	7790-59-2	0.1
1344.	(*1577*)	Potassium tetrachloroplatinate(II)	10025-99-7	0.1
1345.	(*1442*)	Propane sultone	1120-71-4	0.1
1346.	(*1443*)	1-Propanethiol	107-03-9	1
1347.	(*1444*)	Propanolamine	156-87-6	1
1348.	(*186*)	Propargyl alcohol	107-19-7	1
1349.	(*1445*)	*beta*-Propiolactone	57-57-8	0.1
1350.	(*1446*)	Propionaldehyde	123-38-6	1
1351.	(*129*)	Propionic acid	79-09-4	1
1352.	(*234*)	Propionic anhydride	123-62-6	1
1353.	(*522*)	Propionyl chloride	79-03-8	1
1354.	(*32*)	Propyl acetate	109-60-4	1
1355.	(*187*)	Propyl alcohol	71-23-8	1
1356.	(*1452*)	Propylamine	107-10-8	1
1357.	(*440*)	*n*-Propyl chloroformate	109-61-5	1
1358.	(*391*)	Propylene carbonate	108-32-7	1
1359.	(*442*)	Propylene chlorohydrin	78-89-7	1
1360.	(*1453*)	Propylene diamine	78-90-0	1
1361.	(*683*)	Propylene dichloride	78-87-5	1
1362.	(*1454*)	1,2-Propylene glycol	57-55-6	1
1363.	(*751*)	1,2-Propylene glycol dinitrate	6423-43-4	1
1364.	(*833*)	Propylene glycol monomethyl ether	107-98-2	1
1365.	(*1319*)	Propylene oxide	75-56-9	1
1366.	(*1553*)	Propylene sulfide	1072-43-1	1
1367.	(*1455*)	Propylenimine	75-55-8	0.1
1368.	(*1456*)	4-Propylguaiacol	2785-87-7	1
1369.	(*1046*)	*n*-Propyl isocyanate	110-78-1	0.1
1370.	(*1210*)	*n*-Propyl nitrate	627-13-4	1
1371.	(*1450*)	Propyl propionate	106-36-5	1
1372.	(*1457*)	Propyl trichlorosilane	141-57-1	1
1373.	(*1458*)	Pyrene	129-00-0	1
1374.	(*1459*)	Pyridine	110-86-1	1
1375.	(*1461*)	Pyrogallol	87-66-1	1
1376.	(*523*)	Pyrosulfuryl chloride	7791-27-7	1
1377.	(*1463*)	Quinaldine	91-63-4	1
1378.	(*1464*)	Quinoline	91-22-5	1
1379.	(*1465*)	Resorcinol	108-46-3	1
1380.	(*834*)	Resorcinol diglycidyl ether	101-90-6	1
1381.	(*1466*)	Rhodamine B	81-88-9	1
1382.	(*1467*)	Rhodanine	141-84-4	1
1383.	(*1468*)	Rhodium compounds, n.o.s.***	—	1
1384.	(*1469*)	Rhodium, elemental	7440-16-6	1
1385.	(*1659*)	Rhodium trichloride	10049-07-7	1
1386.	(*1470*)	Ricin	9009-86-3	0.1
1387.	(*524*)	Rubidium chloride	7791-11-9	1
1388.	(*997*)	Rubidium hydroxide	1310-82-3	1
1389.	(*986*)	Ruthenium chloride hydroxide	16845-29-7	1
1390.	(*1472*)	Safrole	94-59-7	1
1391.	(*1473*)	Salicylaldehyde	90-02-8	1
1392.	(*130*)	Salicylic acid	69-72-7	0.1
1393.	(*1660*)	Samarium trichloride	10361-82-7	1
1394.	(*131*)	Selenious acid	7783-00-8	1
1395.	(*1478*)	Selenium compounds, n.o.s.***	—	1
1396.	(*772*)	Selenium(IV) dioxide	7446-08-4	1
1397.	(*792*)	Selenium(IV) disulfide	7488-56-4	0.1
1398.	(*1479*)	Selenium, elemental	7782-49-2	0.1
1399.	(*1482*)	1,1′-Selenobisbenzene	1132-39-4	1
1400.	(*1483*)	Selenomethionine	1464-42-2	1
1401.	(*1484*)	Silane	7803-62-5	1
1402.	(*1489*)	Silica, amorphous, diatomaceous earth	68855-54-9	1
1403.	(*1488*)	Silica, amorphous, fumed	7631-86-9	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	Registry Number	CAS Concentration (%-weight/weight)
1404.	(*1487*)	Silica, amorphous, fused	60676-86-0	1
1405.	(*1490*)	Silica, crystalline, cristobalite	14464-46-1	1
1406.	(*1491*)	Silica, crystalline, quartz	14808-60-7	1
1407.	(*1492*)	Silica, crystalline, tridymite	15468-32-3	1
1408.	(*1493*)	Silica, crystalline, tripoli	—	1
1409.	(*1494*)	Silicofluoride compounds, n.o.s.***	—	1
1410.	(*1582*)	Silicon tetrachloride	10026-04-7	1
1411.	(*1590*)	Silicon tetrafluoride	7783-61-1	1
1412.	(*1198*)	Silver ammonium nitrate	23606-32-8	1
1413.	(*587*)	Silver cyanide	506-64-9	1
1414.	(*256*)	Silver, elemental	7440-22-4	1
1415.	(*939*)	Silver heptafluorobutyrate	3794-64-7	1
1416.	(*1197*)	Silver nitrate	7761-88-8	1
1417.	(*1342*)	Silver pentafluoropropionate	509-09-1	1
1418.	(*588*)	Silver potassium cyanide	506-61-6	1
1419.	(*255*)	Silver, water-soluble compounds, n.o.s.***	—	1
1420.	(*1505*)	Soapstone	—	1
1421.	(*1011*)	Sodium aluminum hydride	13770-96-2	1
1422.	(*252*)	Sodium antimonate	11112-10-0	1
1423.	(*263*)	Sodium arsenate	7631-89-2	0.1
1424.	(*267*)	Sodium arsenite	7784-46-5	0.1
1425.	(*272*)	Sodium azide	26628-22-8	1
1426.	(*305*)	Sodium bisulfate	7681-38-1	1
1427.	(*308*)	Sodium bisulfite	7631-90-5	1
1428.	(*315*)	Sodium borate	1330-43-4	1
1429.	(*320*)	Sodium bromate	7789-38-0	1
1430.	(*341*)	Sodium bromide	7647-15-6	0.1
1431.	(*392*)	Sodium carbonate	497-19-8	1
1432.	(*403*)	Sodium chlorite	7758-19-2	1
1433.	(*552*)	Sodium chromate	7775-11-3	1
1434.	(*616*)	Sodium decylbenzenesulfonate	1322-98-1	1
1435.	(*617*)	Sodium dehydroacetate	4418-26-2	1
1436.	(*688*)	Sodium dichromate	10588-01-9	1
1437.	(*759*)	Sodium dinitro-*o*-cresolate	25641-53-6	1
1438.	(*795*)	Sodium dodecylbenzenesulfonate	25155-30-0	1
1439.	(*871*)	Sodium *o*-(ethylmercurithio)benzoate	54-64-8	0.1
1440.	(*910*)	Sodium fluoride	7681-49-4	1
1441.	(*980*)	Sodium hydrosulphide	16721-80-5	1
1442.	(*998*)	Sodium hydroxide	1310-73-2	1
1443.	(*1013*)	Sodium hypochlorite	7681-52-9	1
1444.	(*1029*)	Sodium iodide	7681-82-5	1
1445.	(*845*)	Sodium lauryl ether sulfate	32612-48-9	1
1446.	(*1539*)	Sodium lauryl sulfate	151-21-3	1
1447.	(*1083*)	Sodium metabisulfite	7681-57-4	1
1448.	(*1084*)	Sodium metasilicate	6834-92-0	1
1449.	(*1086*)	Sodium metavanadate	13718-26-8	1
1450.	(*1165*)	Sodium molybdate	7631-95-0	1
1451.	(*1176*)	Sodium monoxide	12401-86-4	1
1452.	(*1211*)	Sodium nitrate	7631-99-4	1
1453.	(*1218*)	Sodium nitrite	7632-00-0	1
1454.	(*1375*)	Sodium phenolate	139-02-6	1
1455.	(*1471*)	Sodium ricinoleate	5323-95-5	1
1456.	(*1477*)	Sodium selenate	13410-01-0	0.1
1457.	(*1558*)	Sodium tellurite	10102-20-2	1
1458.	(*1566*)	Sodium tetraborate	1303-96-4	1
1459.	(*1701*)	Sodium tungstate	13472-45-2	1
1460.	(*1497*)	Solasodine	126-17-0	0.1
1461.	(*1499*)	Sorbaldehyde	142-83-6	1
1462.	(*132*)	Sorbic acid	110-44-1	1
1463.	(*545*)	Stannous chloride dihydrate	10025-69-1	1
1464.	(*133*)	Stearic acid	57-11-4	1
1465.	(*1506*)	Stibamine	6543-62-0	1
1466.	(*134*)	Stibanilic acid	554-76-7	1
1467.	(*1507*)	Stibine	7803-52-3	1
1468.	(*1498*)	Stoddard solvent	8052-41-3	1
1469.	(*526*)	Strontium chloride	10476-85-4	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1470.	(*553*)	Strontium chromate	7789-06-2	0.1
1471.	(*890*)	Strontium fluoborate	13814-98-7	1
1472.	(*1413*)	Strontium phosphide	12504-13-1	1
1473.	(*1508*)	Styrene	100-42-5	0.1
1474.	(*1320*)	Styrene oxide	96-09-3	1
1475.	(*1509*)	Subtilisin BPN	1395-21-7	0.1
1476.	(*135*)	Succinic acid	110-15-6	1
1477.	(*235*)	Succinic anhydride	108-30-5	1
1478.	(*1500*)	Sudan G	85-86-9	1
1479.	(*136*)	Sulfamic acid	5329-14-6	1
1480.	(*1541*)	4,4′-Sulfonyldiphenol	80-09-1	1
1481.	(*525*)	Sulfur chloride	10025-67-9	1
1482.	(*684*)	Sulfur dichloride	10545-99-0	1
1483.	(*773*)	Sulfur dioxide	7446-09-5	1
1484.	(*956*)	Sulfur hexafluoride	2551-62-4	1
1485.	(*138*)	Sulfuric acid	7664-93-9	1
1486.	(*137*)	Sulfurous acid	7782-99-2	1
1487.	(*1347*)	Sulfur pentafluoride	5714-22-7	1
1488.	(*1591*)	Sulfur tetrafluoride	7783-60-0	1
1489.	(*1696*)	Sulfur trioxide	7446-11-9	1
1490.	(*527*)	Sulfuryl chloride	7791-25-5	1
1491.	(*1554*)	Tantalum, elemental	7440-25-7	1
1492.	(*1321*)	Tantalum oxide	1314-61-0	1
1493.	(*139*)	Telluric acid	7803-68-1	1
1494.	(*1556*)	Tellurium compounds, n.o.s.***	—	1
1495.	(*774*)	Tellurium dioxide	7446-07-3	1
1496.	(*1557*)	Tellurium, elemental	13494-80-9	1
1497.	(*957*)	Tellurium hexafluoride	7783-80-4	1
1498.	(*1583*)	Tellurium tetrachloride	10026-07-0	1
1499.	(*528*)	Terbium chloride	10042-88-3	1
1500.	(*140*)	Terephthalic acid	100-21-0	1
1501.	(*1562*)	Terephthalonitrile	623-26-7	1
1502.	(*1563*)	*m*-Terphenyl	92-06-8	1
1503.	(*1564*)	*o*-Terphenyl	84-15-1	1
1504.	(*1565*)	*p*-Terphenyl	92-94-4	1
1505.	(*1600*)	Tetraamminedichloroplatinum(II)	13933-32-9	0.1
1506.	(*1567*)	Tetrabromoethane	25167-20-8	1
1507.	(*141*)	Tetrachloroauric acid	16903-35-8	1
1508.	(*1570*)	3,3′,4,4′-Tetrachloroazobenzene	14047-09-7	1
1509.	(*1571*)	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (TCDD, "dioxin")	1746-01-6	0.1
1510.	(*1572*)	1,1,1,2-Tetrachloro-2,2-difluoro-ethane (FC 112a)	76-11-9	1
1511.	(*1573*)	1,1,2,2-Tetrachloro-1,2-difluoro-ethane (FC 112)	76-12-0	1
1512.	(*1574*)	1,1,1,2-Tetrachloroethane	630-20-6	1
1513.	(*1575*)	1,1,2,2-Tetrachloroethane	79-34-5	1
1514.	(*1576*)	Tetrachloronaphthalene	1335-88-2	1
1515.	(*236*)	Tetrachlorophthalic anhydride	117-08-8	0.1
1516.	(*1578*)	1,1,2,3-Tetrachloropropene	10436-39-2	1
1517.	(*1001*)	Tetraethanol ammonium hydroxide	631-41-4	1
1518.	(*1587*)	Tetraethylenepentamine	112-57-2	1
1519.	(*1436*)	Tetraethyl lead	78-00-2	1
1520.	(*793*)	Tetraethylthiuram disulphide	97-77-8	1
1521.	(*1588*)	Tetraethyl tin	597-64-8	1
1522.	(*1589*)	Tetrafluorohydrazine	10036-47-2	1
1523.	(*1592*)	1,2,3,6-Tetrahydrobenzaldehyde	100-50-5	1
1524.	(*1593*)	Tetrahydrofuran	109-99-9	1
1525.	(*188*)	Tetrahydrofurfuryl alcohol	97-99-4	1
1526.	(*1097*)	Tetrahydrofurfuryl methacrylate	2455-24-5	1
1527.	(*1594*)	Tetrahydronaphthalene	119-64-2	1
1528.	(*237*)	Tetrahydrophthalic acid anhydride	85-43-8	1
1529.	(*1000*)	Tetramethylammonium hydroxide	75-59-2	1
1530.	(*1596*)	*N*,*N*,*N*′,*N*′-Tetramethyl-1,3-butanediamine	97-84-7	1
1531.	(*1437*)	Tetramethyl lead	75-74-1	1
1532.	(*1597*)	Tetramethylsuccinonitrile	3333-52-6	1
1533.	(*1598*)	Tetramethylurea	632-22-4	1
1534.	(*1601*)	Tetranitromethane	509-14-8	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1535.	(*1438*)	Tetrapropyl lead	3440-75-3	1
1536.	(*1462*)	Tetrasodium pyrophosphate	7722-88-5	1
1537.	(*1604*)	Tetryl	479-45-8	1
1538.	(*33*)	Thallium acetate	563-68-8	1
1539.	(*342*)	Thallium bromide	7789-40-4	1
1540.	(*393*)	Thallium(I) carbonate	6533-73-9	1
1541.	(*529*)	Thallium(I) chloride	7791-12-0	1
1542.	(*1606*)	Thallium, elemental	7440-28-0	1
1543.	(*911*)	Thallium(I) fluoride	7789-27-7	1
1544.	(*1030*)	Thallium(I) iodide	7790-30-9	1
1545.	(*1072*)	Thallium malonate	2757-18-8	1
1546.	(*1212*)	Thallium(I) nitrate	10102-45-1	1
1547.	(*1322*)	Thallium(III) oxide	1314-32-5	1
1548.	(*1531*)	Thallium(III) sulfate	16222-66-5	1
1549.	(*1529*)	Thallium sulfate	10031-59-1	1
1550.	(*1530*)	Thallium(I) sulfate	7446-18-6	1
1551.	(*1605*)	Thallium, water-soluble compounds, n.o.s.***	—	1
1552.	(*1607*)	Thioacetamide	62-55-5	0.1
1553.	(*1608*)	4,4'-Thiobis(6-*tert*-butyl-*m*-cresol)	96-69-5	1
1554.	(*1611*)	4,4'-Thiodianiline	139-65-1	1
1555.	(*1613*)	4,4'-Thiodiphenol	2664-63-3	1
1556.	(*142*)	Thiodipropionic acid	111-17-1	1
1557.	(*1615*)	*beta,beta*'-Thiodipropionitrile	111-97-7	1
1558.	(*1616*)	Thioglycol	60-24-2	1
1559.	(*143*)	Thioglycolic acid	68-11-1	1
1560.	(*144*)	2-Thiolactic acid	79-42-5	1
1561.	(*530*)	Thionyl chloride	7719-09-7	1
1562.	(*912*)	Thionyl difluoride	7783-42-8	1
1563.	(*1617*)	Thiophosgene	463-71-8	1
1564.	(*531*)	Thiophosphoryl chloride	3982-91-0	1
1565.	(*1619*)	Thiourea	62-56-6	0.1
1566.	(*1620*)	Thiram	137-26-8	1
1567.	(*532*)	Thulium chloride	13537-18-3	1
1568.	(*145*)	Tiglic acid	80-59-1	1
1569.	(*496*)	Tin(II) chloride	7772-99-8	1
1570.	(*803*)	Tin compounds, n.o.s.***	—	1
1571.	(*804*)	Tin, elemental	7440-31-5	1
1572.	(*905*)	Tin(II) fluoride	7783-47-3	1
1573.	(*1532*)	Titanium sulfate	13825-74-6	1
1574.	(*1584*)	Titanium tetrachloride	7550-45-0	1
1575.	(*1661*)	Titanium trichloride	7705-07-9	1
1576.	(*685*)	Titanocene dichloride	1271-19-8	1
1577.	(*1621*)	*o*-Tolidine	119-93-7	0.1
1578.	(*1622*)	Toluene	108-88-3	1
1579.	(*1624*)	Toluene-2,4-diamine	95-80-7	0.1
1580.	(*1625*)	Toluene-3,4-diamine	496-72-0	0.1
1581.	(*1626*)	Toluene-3,5-diamine	108-71-4	0.1
1582.	(*1623*)	Toluene-ar,ar'-diamine	25376-45-8	0.1
1583.	(*1627*)	Toluene diisocyanate	26471-62-5	0.1
1584.	(*1628*)	Toluene-2,4-diisocyanate	584-84-9	0.1
1585.	(*1629*)	Toluene-2,6-diisocyanate	91-08-7	0.1
1586.	(*1630*)	*o*-Toluenesulfonamide	88-19-7	1
1587.	(*146*)	Toluenesulphonic acid	25231-46-3	1
1588.	(*1632*)	*m*-Toluidine	108-44-1	1
1589.	(*1633*)	*o*-Toluidine	95-53-4	0.1
1590.	(*1634*)	*p*-Toluidine	106-49-0	0.1
1591.	(*191*)	Tolyl aldehyde	1334-78-7	1
1592.	(*1635*)	Triallylamine	102-70-5	1
1593.	(*316*)	Triallyl borate	1693-71-6	1
1594.	(*317*)	Tri-*n*-amyl borate	621-78-3	1
1595.	(*1639*)	Tributylamine	102-82-9	1
1596.	(*318*)	Tributyl borate	688-74-4	1
1597.	(*1395*)	Tributyl phosphate	126-73-8	1
1598.	(*283*)	Tributyltin benzoate	4342-36-3	1
1599.	(*533*)	Tributyltin chloride	1461-22-9	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1600.	(*1098*)	Tributyltin methacrylate	2155-70-6	1
1601.	(*1475*)	Tri-*n*-butyltin salicylate	4342-30-7	1
1602.	(*1640*)	Trichloroacetamide	594-65-0	1
1603.	(*147*)	Trichloroacetic acid	76-03-9	1
1604.	(*534*)	Trichloroacetyl chloride	76-02-8	1
1605.	(*1641*)	1,2,4-Trichlorobenzene	120-82-1	1
1606.	(*1642*)	1,3,5-Trichlorobenzene	108-70-3	1
1607.	(*1643*)	Trichlorobutene	51023-22-4	1
1608.	(*1323*)	Trichlorobutylene oxide	3083-25-8	1
1609.	(*1324*)	Trichloro diphenyl oxide	57321-63-8	1
1610.	(*1644*)	1,1,1-Trichloroethane	71-55-6	0.1
1611.	(*1645*)	1,1,2-Trichloroethane	79-00-5	1
1612.	(*1646*)	Trichloroethylene	79-01-6	1
1613.	(*1647*)	Trichlorofluoromethane (FC 11)	75-69-4	1
1614.	(*148*)	Trichloroisocyanuric acid	87-90-1	1
1615.	(*1648*)	Trichloronaphthalene	1321-65-9	1
1616.	(*1649*)	1,2,3-Trichloropropane	96-18-4	1
1617.	(*1650*)	Trichlorosilane	10025-78-2	1
1618.	(*1651*)	1,1,2-Trichloro-1,2,2-trifluoro-ethane (FC 113)	76-13-1	1
1619.	(*1396*)	Tricresyl phosphate	1330-78-5	1
1620.	(*1397*)	Tri-*ortho*-cresyl phosphate	78-30-8	1
1621.	(*1663*)	Triethanolamine	102-71-6	1
1622.	(*1664*)	Triethylallylgermanium	1793-90-4	1
1623.	(*1665*)	Triethylamine	121-44-8	1
1624.	(*1666*)	Triethylenediamine	280-57-9	1
1625.	(*1667*)	Triethylene glycol	112-27-6	1
1626.	(*726*)	Triethylene glycol dimethacrylate	109-16-0	1
1627.	(*835*)	Triethylene glycol monobutyl ether	143-22-6	1
1628.	(*1668*)	Triethylenemelamine	51-18-3	0.1
1629.	(*1669*)	Triethylenetetramine	112-24-3	0.1
1630.	(*149*)	Trifluoroacetic acid	76-05-1	1
1631.	(*238*)	Trifluoroacetic acid anhydride	407-25-0	1
1632.	(*1670*)	Trifluorobromomethane	75-63-8	1
1633.	(*1671*)	2-(Trifluoromethyl) aniline	88-17-5	1
1634.	(*1672*)	3-(Trifluoromethyl) aniline	98-16-8	1
1635.	(*1680*)	Triisopropanolamine	122-20-3	1
1636.	(*239*)	Trimellitic anhydride	552-30-7	0.1
1637.	(*1681*)	Trimethylamine	75-50-3	1
1638.	(*1682*)	Trimethylbenzene	25551-13-7	1
1639.	(*1683*)	1,2,3-Trimethylbenzene	526-73-8	1
1640.	(*1684*)	1,2,4-Trimethylbenzene	95-63-6	0.1
1641.	(*1685*)	1,3,5-Trimethylbenzene	108-67-8	0.1
1642.	(*319*)	Trimethyl borate	121-43-7	1
1643.	(*1686*)	3,3,5-Trimethylcyclohexanol	116-02-9	1
1644.	(*1687*)	Trimethylcyclohexylamine	34216-34-7	1
1645.	(*1688*)	Trimethylhexamethylene diamine	25620-58-0	1
1646.	(*719*)	Trimethylhexamethylene diisocyanate	28679-16-5	0.1
1647.	(*1398*)	Trimethylphosphate	512-56-1	0.1
1648.	(*1404*)	Trimethyl phosphite	121-45-9	1
1649.	(*1689*)	Trimethylthiourea	2489-77-2	1
1650.	(*535*)	Trimethyltin chloride	1066-45-1	0.1
1651.	(*1690*)	2,4,6-Trinitrotoluene	118-96-7	1
1652.	(*1698*)	Triphenylamine	603-34-9	1
1653.	(*1399*)	Triphenyl phosphate	115-86-6	1
1654.	(*1405*)	Triphenyl phosphite	101-02-0	1
1655.	(*34*)	Triphenyltin acetate	900-95-8	0.1
1656.	(*536*)	Triphenyltin chloride	639-58-7	1
1657.	(*999*)	Triphenyltin hydroxide	76-87-9	0.1
1658.	(*1699*)	Tripropylamine	102-69-2	1
1659.	(*1325*)	Tris(1-aziridinyl)phosphine oxide	545-55-1	1
1660.	(*1400*)	Tris(dibromopropyl) phosphate	126-72-7	0.1
1661.	(*1291*)	Trisodium orthovanadate	13721-39-6	1
1662.	(*253*)	Tungsten antimonate	69600-03-9	1
1663.	(*1702*)	Tungsten compounds, n.o.s.***	—	1
1664.	(*1703*)	Tungsten, elemental	7440-33-7	1

INGREDIENT DISCLOSURE LIST—*Continued*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1665.	(*1561*)	Turpentine	8006-64-2	1
1666.	(*1704*)	Undecanol	112-42-5	1
1667.	(*1706*)	Uranium compounds, n.o.s.***	—	1
1668.	(*1707*)	Uranium, elemental	7440-61-1	1
1669.	(*1213*)	Uranyl nitrate	10102-06-4	1
1670.	(*1708*)	Urethane	51-79-6	0.1
1671.	(*1709*)	Valeraldehyde	110-62-3	1
1672.	(*150*)	Valeric acid	109-52-4	1
1673.	(*537*)	Valeryl chloride	638-29-9	1
1674.	(*1711*)	Vanadic acid, triisobutyl ester	19120-62-8	1
1675.	(*1712*)	Vanadium, elemental	7440-62-2	1
1676.	(*1331*)	Vanadium oxytrichloride	7727-18-6	1
1677.	(*1352*)	Vanadium pentoxide	1314-62-1	0.1
1678.	(*1585*)	Vanadium tetrachloride	7632-51-1	1
1679.	(*1662*)	Vanadium trichloride	7718-98-1	1
1680.	(*1697*)	Vanadium trioxide	1314-34-7	0.1
1681.	(*1533*)	Vanadyl sulfate	27774-13-6	1
1682.	(*1713*)	Veratraldehyde	120-14-9	1
1683.	(*35*)	Vinyl acetate	108-05-4	1
1684.	(*343*)	Vinyl bromide	593-60-2	0.1
1685.	(*538*)	Vinyl chloride	75-01-4	0.1
1686.	(*407*)	Vinyl chloroacetate	2549-51-1	1
1687.	(*836*)	Vinyl 2-chloroethyl ether	110-75-8	1
1688.	(*775*)	Vinyl cyclohexene dioxide	106-87-6	0.1
1689.	(*539*)	Vinylidene chloride	75-35-4	1
1690.	(*1716*)	*N*-Vinyl-2-pyrrolidone	88-12-0	1
1691.	(*1717*)	Vinyltoluene	25013-15-4	1
1692.	(*1718*)	Vinyltrichlorosilane	75-94-5	1
1693.	(*1180*)	VM&P naphtha	8032-32-4	1
1694.	(*1722*)	*m*-Xylene	108-38-3	1
1695.	(*1723*)	*o*-Xylene	95-47-6	1
1696.	(*1724*)	*p*-Xylene	106-42-3	0.1
1697.	(*1725*)	*m*-Xylene-*alpha,alpha'*-diamine	1477-55-0	1
1698.	(*1729*)	Xylenol	1300-71-6	1
1699.	(*1726*)	Xylidine	1300-73-8	1
1700.	(*1727*)	2,4-Xylidine	95-68-1	1
1701.	(*1728*)	2,5-Xylidine	95-78-3	1
1702.	(*344*)	Xylyl bromide	28258-59-5	1
1703.	(*540*)	Ytterbium chloride	10361-91-8	1
1704.	(*1214*)	Ytterbium nitrate	13768-67-7	1
1705.	(*1731*)	Yttrium compounds	—	1
1706.	(*1732*)	Yttrium, elemental	7440-65-5	1
1707.	(*1535*)	Zinc ammonium sulfate	7783-24-6	1
1708.	(*776*)	Zinc bis(pentachlorophenol)	117-97-5	1
1709.	(*541*)	Zinc chloride	7646-85-7	1
1710.	(*554*)	Zinc chromate	13530-65-9	0.1
1711.	(*596*)	Zinc cyanide	557-21-1	1
1712.	(*689*)	Zinc dichromate	14018-95-2	0.1
1713.	(*703*)	Zinc diethyldithiocarbamate	14324-55-1	1
1714.	(*874*)	Zinc ethylphenyldithiocarbamate	14634-93-6	1
1715.	(*913*)	Zinc fluoride	7783-49-5	1
1716.	(*1002*)	Zinc hydroxide	20427-58-1	1
1717.	(*1326*)	Zinc oxide	1314-13-2	1
1718.	(*1360*)	Zinc permanganate	23414-72-4	1
1719.	(*1414*)	Zinc phosphide	1314-84-7	1
1720.	(*1406*)	Zinc phosphite	14332-59-3	1
1721.	(*597*)	Zinc potassium cyanide	14244-62-3	1
1722.	(*1451*)	Zinc propionate	557-28-8	0.1
1723.	(*1460*)	Zinc pyrithione	13463-41-7	0.1
1724.	(*1496*)	Zinc silicofluoride	16871-71-9	1
1725.	(*1504*)	Zinc stearate	557-05-1	1
1726.	(*1534*)	Zinc sulfate	7733-02-0	1
1727.	(*1059*)	Zinc yellow	37300-23-5	1
1728.	(*1733*)	Ziram	137-30-4	1
1729.	(*1734*)	Zircon	14940-68-2	1

INGREDIENT DISCLOSURE LIST—*Concluded*

		Column I Ingredient		Column II
Item		Chemical Identity	CAS Registry Number	Concentration (%-weight/weight)
1730.	(*45*)	Zirconium acetylacetonate	17501-44-9	1
1731.	(*987*)	Zirconium chloride hydroxide	10119-31-0	1
1732.	(*1735*)	Zirconium compounds, n.o.s.***	—	1
1733.	(*1736*)	Zirconium, elemental	7440-67-2	1
1734.	(*900*)	Zirconium potassium fluoride	16923-95-8	1
1735.	(*1063*)	Zirconium sodium lactate	10377-98-7	1
1736.	(*1586*)	Zirconium tetrachloride	10026-11-6	1

Note : * "CAS" means the Chemical Abstracts Service Division of the American Chemical Society.

** The number shown in parentheses beside the item number of an ingredient corresponds to the item number of the ingredient in the French version of the List.

*** "n.o.s." means not otherwise specified.

ANNEXE

LISTE DE DIVULGATION DES INGRÉDIENTS

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
1.	(*1003*)**	Abiétate de méthyle	127-25-3	1
2.	(*3*)	Acenaphtène	83-32-9	1
3.	(*4*)	Acétaldéhyde	75-07-0	1
4.	(*5*)	*p*-Acétamidobenzènestibonate de sodium	138-31-8	1
5.	(*29*)	Acétate d'allyle	591-87-7	1
6.	(*104*)	Acétate de *sec*-amyle	626-38-0	1
7.	(*123*)	Acétate d'antimoine (III)	6923-52-0	1
8.	(*140*)	Acétate de baryum	543-80-6	1
9.	(*230*)	Acétate de *n*-butyle	123-86-4	1
10.	(*231*)	Acétate de *sec*-butyle	105-46-4	1
11.	(*232*)	Acétate de *tert*-butyle	540-88-5	1
12.	(*283*)	Acétate de cadmium	543-90-8	1
13.	(*392*)	Acétate de chrome (III)	1066-30-4	1
14.	(*412*)	Acétate de cobalt (II)	71-48-7	1
15.	(*471*)	Acétate de cyclohexyle	622-45-7	1
16.	(*687*)	Acétate de 2-éthoxyéthyle	111-15-9	0,1
17.	(*689*)	Acétate d'éthyle	141-78-6	1
18.	(*834*)	Acétate de *n*-hexyle	142-92-7	1
19.	(*835*)	Acétate de *sec*-hexyle	108-84-9	1
20.	(*883*)	Acétate d'isoamyle	123-92-2	1
21.	(*888*)	Acétate d'isobutyle	110-19-0	1
22.	(*906*)	Acétate d'isopropyle	108-21-4	1
23.	(*969*)	Acétate de manganèse (II)	638-38-0	1
24.	(*1000*)	Acétate de 2-méthoxyéthyle	110-49-6	0,1
25.	(*1018*)	Acétate de méthylazoxyméthyle	592-62-1	1
26.	(*1004*)	Acétate de méthyle	79-20-9	1
27.	(*1120*)	Acétate de nickel (II)	373-02-4	0,1
28.	(*1245*)	Acétate de pentyle	628-63-7	1
29.	(*1279*)	Acétate de phénylmercurique	62-38-4	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
30.	(*929*)	Acétate de plomb	301-04-2	0,1
31.	(*930*)	Acétate de plomb basique	1335-32-6	0,1
32.	(*1354*)	Acétate de propyle	109-60-4	1
33.	(*1538*)	Acétate de thallium	563-68-8	1
34.	(*1655*)	Acétase de triphénylétain	900-95-8	0,1
35.	(*1683*)	Acétate de vinyle	108-05-4	1
36.	(*977*)	Acétate mercurique	1600-27-7	0,1
37.	(*772*)	Acétate mercurique/fluorescéine	3570-80-7	1
38.	(*8*)	*o*-Acétoacétaniside	92-15-9	1
39.	(*1005*)	Acétoacétate de méthyle	105-45-3	1
40.	(*9*)	*p*-Acétoaminoaniline	122-80-5	1
41.	(*10*)	Acétone	67-64-1	1
42.	(*11*)	Acétonecyanhydrine	75-86-5	1
43.	(*12*)	Acétonitrile	75-05-8	0,1
44.	(*13*)	Acétophénone	98-86-2	1
45.	(*1730*)	Acétylacétonate de zirconium	17501-44-9	1
46.	(*14*)	4-Acétylaminobiphényle	4075-79-0	1
47.	(*15*)	2-Acétylaminofluorène	53-96-3	0,1
48.	(*19*)	Acétylméthylcarbinol	513-86-0	1
49.	(*20*)	4-Acétylrésorcinol	89-84-9	1
50.	(*2*)	Acide abiétique	514-10-3	0,1
51.	(*6*)	Acide acétique	64-19-7	1
52.	(*24*)	Acide acrylique	79-10-7	1
53.	(*26*)	Acide adipique	124-04-9	1
54.	(*57*)	Acide 4-aminoazobenzène-3,4′-disulfonique	101-50-8	1
55.	(*59*)	Acide 2-amino-*p*-benzènedisulfonique	98-44-2	1
56.	(*61*)	Acide *p*-aminobenzoïque	150-13-0	1
57.	(*66*)	Acide 5-amino-6-éthoxy-2-naphtalènesulfonique	118-28-5	1
58.	(*69*)	Acide 2-amino-3-hydroxybenzoïque	548-93-6	1
59.	(*71*)	Acide 2-amino-1,5-naphtalènedisulfonique	117-62-4	1
60.	(*72*)	Acide 3-amino-1,5-naphtalènedisulfonique	131-27-1	1
61.	(*73*)	Acide 6-amino-1,3-naphtalènedisulfonique	118-33-2	1
62.	(*74*)	Acide 2-amino-1-naphtalènesulfonique	81-16-3	1
63.	(*84*)	Acide 4-aminosalicylique	65-49-6	1
64.	(*105*)	Acide amylphosphorique	12789-46-7	1
65.	(*129*)	Acide arsénique	7778-39-4	0,1
66.	(*160*)	Acide benzoïque	65-85-0	1
67.	(*204*)	Acide borique	10043-35-3	1
68.	(*215*)	Acide bromoacétique	79-08-3	1
69.	(*240*)	Acide *p-tert*-butylbenzoïque	98-73-7	0,1
70.	(*260*)	Acide butylphosphorique	12788-93-1	1
71.	(*268*)	Acide butyrique	107-92-6	1
72.	(*306*)	Acide caprique	334-48-5	1
73.	(*330*)	Acide chlorique	7790-93-4	1
74.	(*338*)	Acide chloroacétique	79-11-8	1
75.	(*348*)	Acide *o*-chlorobenzoïque	118-91-2	1
76.	(*370*)	Acide 2-chloro-4-nitrobenzoïque	99-60-5	1
77.	(*379*)	Acide chloroplatinique	16941-12-1	0,1
78.	(*383*)	Acide chlorosulfonique	7790-94-5	1
79.	(*391*)	Acide chromique	7738-94-5	1
80.	(*409*)	Acide citrique	77-92-9	1
81.	(*589*)	Acide di(2-éthylhexyl)phosphorique	298-07-7	1
82.	(*599*)	Acide difluorophosphorique	13779-41-4	1
83.	(*679*)	Acide dodécylbenzènesulfonique	27176-87-0	1
84.	(*704*)	Acide 2-éthylbutyrique	88-09-5	1
85.	(*732*)	Acide 2-éthylhexoïque	149-57-5	1
86.	(*754*)	Acide d'éthylsulfurique	540-82-9	1
87.	(*779*)	Acide fluorosilicique	16961-83-4	1
88.	(*780*)	Acide fluorosulfonique	7789-21-1	1
89.	(*783*)	Acide formique	64-18-6	1
90.	(*784*)	Acide fumarique	110-17-8	1
91.	(*820*)	Acide hexafluorophosphorique	16940-81-1	1
92.	(*830*)	Acide hexanoïque	142-62-1	1
93.	(*843*)	Acide hydrazoïque	7782-79-8	1
94.	(*854*)	Acide hydroxyacétique	79-14-1	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
95.	(*891*)	Acide isobutyrique	79-31-2	1
96.	(*895*)	Acide isocyanurique	108-80-5	1
97.	(*897*)	Acide isopentanoïque	503-74-2	1
98.	(*901*)	Acide isophtalique	121-91-5	1
99.	(*917*)	Acide isopropylphosphorique	1623-24-1	1
100.	(*921*)	Acide lactique	50-21-5	1
101.	(*947*)	Acide lévulinique	123-76-2	1
102.	(*950*)	Acide linoléique	60-33-3	1
103.	(*962*)	Acide maléique	110-16-7	1
104.	(*965*)	Acide malique	6915-15-7	1
105.	(*992*)	Acide métanilique	121-47-1	1
106.	(*994*)	Acide méthacrylique	79-41-4	1
107.	(*1097*)	Acide monofluorophosphorique	13537-32-1	1
108.	(*1105*)	Acide myristique	544-63-8	1
109.	(*1114*)	Acide 1-naphtylamine-6-sulfonique	119-79-9	1
110.	(*1148*)	Acide nitrilotriacétique	139-13-9	0,1
111.	(*1146*)	Acide nitrique	7697-37-2	1
112.	(*1158*)	Acide nitrobenzènesulfonique	31212-28-9	1
113.	(*1159*)	Acide *m*-nitrobenzènesulfonique	98-47-5	1
114.	(*1160*)	Acide *m*-nitrobenzènesulfonique, sel de sodium	127-68-4	1
115.	(*1161*)	Acide *p*-nitrobenzoïque	62-23-7	1
116.	(*1180*)	Acide nitrochlorhydrique	8007-56-5	1
117.	(*1206*)	Acide nitrosylsulfurique	7782-78-7	1
118.	(*1220*)	Acide octanoïque	124-07-2	1
119.	(*1225*)	Acide oléique	112-80-1	1
120.	(*1228*)	Acide oxalique	144-62-7	0,1
121.	(*1238*)	Acide pélargonique	112-05-0	1
122.	(*1248*)	Acide perchlorique	7601-90-3	1
123.	(*1253*)	Acide peroxyacétique	79-21-0	1
124.	(*1262*)	Acide phénolsulfonique	1333-39-7	1
125.	(*1266*)	Acide phénylarsonique	98-05-5	1
126.	(*1294*)	Acide phosphoreux	13598-36-2	1
127.	(*1291*)	Acide phosphorique	7664-38-2	1
128.	(*1310*)	Acide picrique	88-89-1	1
129.	(*1351*)	Acide propionique	79-09-4	1
130.	(*1392*)	Acide salicylique	69-72-7	0,1
131.	(*1394*)	Acide sélénieux	7783-00-8	1
132.	(*1462*)	Acide sorbique	110-44-1	1
133.	(*1464*)	Acide stéarique	57-11-4	1
134.	(*1466*)	Acide stibanilique	554-76-7	1
135.	(*1476*)	Acide succinique	110-15-6	1
136.	(*1479*)	Acide sulfamique	5329-14-6	1
137.	(*1486*)	Acide sulfureux	7782-99-2	1
138.	(*1485*)	Acide sulfurique	7664-93-9	1
139.	(*1493*)	Acide tellurique	7803-68-1	1
140.	(*1500*)	Acide téréphtalique	100-21-0	1
141.	(*1507*)	Acide tétrachloroaurique	16903-35-8	1
142.	(*1556*)	Acide thiodipropionique	111-17-1	1
143.	(*1559*)	Acide thioglycolique	68-11-1	1
144.	(*1560*)	Acide 2-thiolactique	79-42-5	1
145.	(*1568*)	Acide tiglique	80-59-1	1
146.	(*1587*)	Acide toluènesulfonique	25231-46-3	1
147.	(*1603*)	Acide trichloroacétique	76-03-9	1
148.	(*1614*)	Acide trichloroisocyanurique	87-90-1	1
149.	(*1630*)	Acide trifluoroacétique	76-05-1	1
150.	(*1672*)	Acide valérique	109-52-4	1
151.	(*22*)	Acroléine	107-02-8	1
152.	(*23*)	Acrylamide	79-06-1	0,1
153.	(*233*)	Acrylate de butyle	141-32-2	1
154.	(*457*)	Acrylate de 2-cyanoéthyle	106-71-8	1
155.	(*722*)	Acrylate d'éther d'éthylèneglycol et de monoéthyle	106-74-1	1
156.	(*690*)	Acrylate d'éthyle	140-88-5	1
157.	(*733*)	Acrylate de 2-éthylhexyle	103-11-7	1
158.	(*798*)	Acrylate de glycidyle	106-90-1	1
159.	(*857*)	Acrylate d'hydroxyéthyle	818-61-1	1

LISTE DE DIVULGATION DES INGRÉDIENTS *(suite)*

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
160.	*(865)*	Acrylate de 2-hydroxypropyle	999-61-1	1
161.	*(1009)*	Acrylate de méthyle	96-33-3	1
162.	*(25)*	Acrylonitrile	107-13-1	0,1
163.	*(570)*	Adipate de diéthyle	141-28-6	0,1
164.	*(194)*	Adipate de di(2-éthylhexyle)	103-23-1	0,1
165.	*(606)*	Adipate de diisobutyle	141-04-8	0,1
166.	*(27)*	Adiponitrile	111-69-3	1
167.	*(30)*	Alcool allylique	107-18-6	1
168.	*(106)*	Alcool *n*-amylique	71-41-0	1
169.	*(107)*	Alcool *sec*-amylique	6032-29-7	1
170.	*(169)*	Alcool benzylique	100-51-6	1
171.	*(451)*	Alcool cuminique	536-60-7	1
172.	*(483)*	Alcool diacétonique	123-42-2	1
173.	*(734)*	Alcool 2-éthylhexylique	104-76-7	1
174.	*(759)*	Alcool alpha-fenchylique	512-13-0	1
175.	*(787)*	Alcool furfurylique	98-00-0	1
176.	*(832)*	Alcool *n*-hexylique	111-27-3	1
177.	*(833)*	Alcool *sec*-hexylique	97-95-0	1
178.	*(884)*	Alcool isoamylique	123-51-3	1
179.	*(896)*	Alcool isooctylique	26952-21-6	1
180.	*(924)*	Alcool laurylique	112-53-8	1
181.	*(688)*	Alcool laurylique éthoxylé	9002-92-0	1
182.	*(1020)*	Alcool *alpha*-méthylbenzylique	98-85-1	1
183.	*(1012)*	Alcool méthylique	67-56-1	1
184.	*(1106)*	Alcool myristique	112-72-1	1
185.	*(1258)*	Alcool phénétylique	60-12-8	1
186.	*(1348)*	Alcool propargylique	107-19-7	1
187.	*(1355)*	Alcool propylique	71-23-8	1
188.	*(1525)*	Alcool tétrahydrofurfurylique	97-99-4	1
189.	*(925)*	Aldéhyde laurique	112-54-9	1
190.	*(1107)*	Aldéhyde myristique	5780-07-4	1
191.	*(1591)*	Aldéhyde tolylique	1334-78-7	1
192.	*(28)*	Aldol	107-89-1	1
193.	*(31)*	Allylamine	107-11-9	1
194.	*(43)*	Allyltrichlorosilane	107-37-9	1
195.	*(44)*	alpha-Alumine	1344-28-1	1
196.	*(45)*	Aluminium, composés alkylés	—	1
197.	*(47)*	Aluminium élémentaire	7429-90-5	1
198.	*(53)*	Aluminium, sels hydrosolubles, n.s.a.***	—	1
199.	*(137)*	Amiante	1332-21-4	0,1
200.	*(103)*	Amiante amosite	12172-73-5	0,1
201.	*(406)*	Amiante chrysotile	12001-29-5	0,1
202.	*(447)*	Amiante crocidolite	12001-28-4	0,1
203.	*(54)*	1-Aminoanthraquinone	82-45-1	1
204.	*(55)*	2-Aminoanthraquinone	117-79-3	0,1
205.	*(56)*	Aminoazobenzène	60-09-3	1
206.	*(58)*	Aminoazotoluène	97-56-3	1
207.	*(60)*	*m*-Aminobenzènesulfonate de sodium	1126-34-7	1
208.	*(62)*	2-Amino-4-chlorophénol	95-85-2	1
209.	*(64)*	*p*-Aminodiphénylamine	101-54-2	0,1
210.	*(63)*	4-Aminodiphényle	92-67-1	0,1
211.	*(65)*	2-(2-Aminoéthoxy)éthanol	929-06-6	1
212.	*(67)*	*N*-Aminoéthyléthanolamine	111-41-1	0,1
213.	*(68)*	*N*-(Aminoéthyl)pipérazine	140-31-8	1
214.	*(70)*	1-Amino-2-méthylanthraquinone	82-28-0	0,1
215.	*(75)*	2-Amino-4-nitroaniline	99-56-9	1
216.	*(76)*	4-Amino-2-nitroaniline	5307-14-2	1
217.	*(77)*	*m*-Aminophénol	591-27-5	0,1
218.	*(78)*	*o*-Aminophénol	95-55-6	0,1
219.	*(79)*	*p*-Aminophénol	123-30-8	1
220.	*(80)*	*p*-Aminophénol, chlorhydrate	51-78-5	0,1
221.	*(81)*	Aminopropyldiéthanolamine	4985-85-7	1
222.	*(82)*	*N*-Aminopropylmorpholine	123-00-2	1
223.	*(83)*	2-Aminopyridine	504-29-0	1
224.	*(85)*	1-Amino-2-thiourée	79-19-6	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
225.	(*86*)	Ammoniac	7664-41-7	1
226.	(*108*)	Amyltrichlorosilane	107-72-2	1
227.	(*7*)	Anhydride acétique	108-24-7	1
228.	(*205*)	Anhydride borique	1303-86-2	1
229.	(*269*)	Anhydride butyrique	106-31-0	1
230.	(*892*)	Anhydride isobutyrique	97-72-3	1
231.	(*964*)	Anhydride maléique	108-31-6	0,1
232.	(*1293*)	Anhydride phosphorique	1314-56-3	1
233.	(*1306*)	Anhydride phtalique	85-44-9	0,1
234	(*1352*)	Anhydride propionique	123-62-6	1
235.	(*1477*)	Anhydride succinique	108-30-5	1
236.	(*1515*)	Anhydride tétrachlorophtalique	117-08-8	0,1
237.	(*1528*)	Anhydride l'acide tétrahydrophtalique	85-43-8	1
238.	(*1631*)	Anhydride trifluoroacétique	407-25-0	1
239.	(*1636*)	Anhydride trimellitique	552-30-7	0,1
240.	(*109*)	Aniline	62-53-3	1
241.	(*110*)	Aniline, chlorhydrate d'	142-04-1	1
242.	(*111*)	4-Anilinophénol	122-37-2	1
243.	(*112*)	*o*-Anisaldéhyde	135-02-4	1
244.	(*113*)	*p*-Anisaldéhyde	123-11-5	1
245.	(*114*)	*o*-Anisidine	90-04-0	0,1
246.	(*115*)	*p*-Anisidine	104-94-9	1
247.	(*117*)	Anisole	100-66-3	1
248.	(*119*)	Anthanthrène	191-26-4	1
249.	(*120*)	Anthracène	120-12-7	1
250.	(*121*)	Antimoine, composés, n.s.a.***	—	1
251.	(*122*)	Antimoine élémentaire	7440-36-0	1
252.	(*1422*)	Antimoniate de sodium	11112-10-0	1
253.	(*1662*)	Antimoniate de tunsgtène	69600-03-9	1
254.	(*116*)	Antimoniotartrate d'*o*-anisidine	64070-14-0	1
255.	(*1419*)	Argent, composés hydrosolubles, n.s.a.***	—	1
256.	(*1414*)	Argent élémentaire	7440-22-4	1
257.	(*127*)	Arochlore 1254 (PCB)	11097-69-1	0,1
258.	(*128*)	Arochlore 1260 (PCB)	11096-82-5	0,1
259.	(*677*)	Arséniate acide de disodium	7778-43-0	1
260.	(*297*)	Arséniate de calcium	7778-44-1	0,1
261.	(*957*)	Arséniate de magnésium	10103-50-1	1
262.	(*931*)	Arséniate de plomb	7784-40-9	1
263.	(*1423*)	Arséniate de sodium	7631-89-2	0,1
264.	(*1332*)	Arséniate monopotassique	7784-41-0	1
265.	(*132*)	Arsenic, composés hydrosolubles, n.s.a.***	—	1
266.	(*130*)	Arsenic élémentaire	7440-38-2	0,1
267.	(*1424*)	Arsénite de sodium	7784-46-5	0,1
268.	(*136*)	Arsine	7784-42-1	0,1
269.	(*276*)	Aviveur fluorescent, C.I. 46	6416-68-8	1
270.	(*138*)	1-Aziridinoéthanol	1072-52-2	1
271.	(*139*)	Azobenzène	103-33-3	1
272.	(*1425*)	Azoture de sodium	26628-22-8	1
273.	(*147*)	Baryum, composés hydrosolubles, n.s.a.***	—	1
274.	(*149*)	Bauxite	1318-16-7	1
275.	(*150*)	Benzaldéhyde	100-52-7	1
276.	(*152*)	Benzanthrone	82-05-3	1
277.	(*153*)	Benzène	71-43-2	0,1
278.	(*155*)	Benzènesulfonate de sodium (alkyle linéaire)	68411-30-3	1
279.	(*157*)	Benzidine	92-87-5	0,1
280.	(*158*)	Benzile	134-81-6	1
281.	(*151*)	Benzo(a)anthracène	56-55-3	0,1
282.	(*239*)	Benzoate de butyle	136-60-7	1
283.	(*1598*)	Benzoate de tributylétain	4342-36-3	1
284.	(*159*)	Benzo(b)fluoranthène	205-99-2	0,1
285.	(*161*)	alpha-Benzoïne-oxime	441-38-3	1
286.	(*162*)	Benzonitrile	100-47-0	1
287.	(*163*)	Benzo(a)pyrène	50-32-8	0,1
288.	(*164*)	*o*-Benzoquinone	583-63-1	1
289.	(*165*)	*p*-Benzoquinone	106-51-4	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
290.	(*174*)	*N*-Benzyldiméthylamine	103-83-3	1
291.	(*176*)	Benzylidène-acétone	122-57-6	1
292.	(*178*)	Bertrandite	12161-82-9	0,1
293.	(*179*)	Béryle	1302-52-9	0,1
294.	(*181*)	Béryllium, composés, n.s.a.***	—	0,1
295.	(*182*)	Béryllium élémentaire	7440-41-7	0,1
296.	(*187*)	Bis (4-amino-1-anthraquinonyl)amine	128-87-0	1
297.	(*188*)	1,4-Bis (aminométhyl)cyclohexane	2549-93-1	1
298.	(*189*)	*N,N*-Bis (3-aminopropyl)méthylamine	105-83-9	1
299.	(*193*)	1,2-Bis(diméthylamino)éthane	110-18-9	1
300.	(*195*)	Bis (2-éthylhexyloxycarbonylméthylthio)dibutylstannane	25168-24-5	1
301.	(*196*)	Bis((2-éthylhexyloxy)maléyloxy) dibutylstannane	15546-12-0	1
302.	(*199*)	Bisphénol A	80-05-7	1
303.	(*675*)	4,4′-Bis (2-sulfostyryl)biphényle (sel de disodium)	27344-41-8	0,1
304.	(*201*)	1,4-Bis (*p*-tolylamino)anthraquinone	128-80-3	1
305.	(*1426*)	Bisulfate de sodium	7681-38-1	1
306.	(*87*)	Bisulfite d'ammonium	10192-30-0	1
307.	(*298*)	Bisulfite de calcium	13780-03-5	1
308.	(*1427*)	Bisulfite de sodium	7631-90-5	1
309.	(*279*)	Bleu de cuve, C.I. 16	6424-76-6	1
310.	(*280*)	Bleu de cuve, C.I. 22	6373-20-2	1
311.	(*1043*)	Bleu de méthylène	61-73-4	1
312.	(*673*)	Bleu direct 6 (qualité industrielle)	2602-46-2	0,1
313.	(*672*)	Bleu direct 53	314-13-6	1
314.	(*277*)	Bleu solvant, C.I. 53	61969-42-4	1
315.	(*1428*)	Borate de sodium	1330-43-4	1
316.	(*1593*)	Borate de triallyle	1693-71-6	1
317.	(*1594*)	Borate de tri-*n*-amyle	621-78-3	1
318.	(*1596*)	Borate de tributyle	688-74-4	1
319.	(*1642*)	Borate de triméthyle	121-43-7	1
320.	(*1429*)	Bromate de sodium	7789-38-0	1
321.	(*211*)	Brome	7726-95-6	1
322.	(*701*)	Bromoacétate d'éthyle	105-36-2	1
323.	(*1023*)	Bromoacétate de méthyle	96-32-2	1
324.	(*216*)	Bromoacétone	598-31-2	1
325.	(*219*)	Bromodichlorométhane	75-27-4	1
326.	(*220*)	Bromoforme	75-25-2	1
327.	(*17*)	Bromure d'acéthylène	79-27-6	1
328.	(*16*)	Bromure d'acétyle	506-96-7	1
329.	(*32*)	Bromure d'allyle	106-95-6	1
330.	(*170*)	Bromure de benzyle	100-39-0	1
331.	(*217*)	Bromure de bromoacétyle	598-21-0	1
332.	(*242*)	Bromure de *n*-butyle	109-65-9	0,1
333.	(*413*)	Bromure de cobalt (II)	7789-43-7	1
334.	(*459*)	Bromure de cyanogène	506-68-3	1
335.	(*664*)	Bromure de diphénylméthyle	776-74-9	1
336.	(*700*)	Bromure d'éthyle	74-96-4	1
337.	(*714*)	Bromure d'éthylène (1,2-dibromoéthane)	106-93-4	0,1
338.	(*844*)	Bromure d'hydrogène	10035-10-6	1
339.	(*1256*)	Bromure de phénacycle	70-11-1	1
340.	(*1328*)	Bromure de potassium	7758-02-3	0,1
341.	(*1430*)	Bromure de sodium	7647-15-6	0,1
342.	(*1539*)	Bromure de thallium	7789-40-4	1
343.	(*1684*)	Bromure de vinyle	593-60-2	0,1
344.	(*1702*)	Bromure de xylyle	28258-59-5	1
345.	(*979*)	Bromure mercurique	7789-47-1	1
346.	(*221*)	Brucine	357-57-3	1
347.	(*281*)	Brun de cuve, C.I. 1	2475-33-4	1
348.	(*674*)	Brun direct 95 (qualité industrielle)	16071-86-6	0,1
349.	(*222*)	Butadiène	106-99-0	0,1
350.	(*223*)	Butane	106-97-8	1
351.	(*224*)	1,3-Butanediol	107-88-0	0,1
352.	(*226*)	2,3-Butanedione	431-03-8	1
353.	(*227*)	1,4-Butanesultone	1633-83-6	1
354.	(*234*)	*n*-Butanol	71-36-3	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
355.	(*228*)	*sec*-Butanol	78-92-2	1
356.	(*229*)	*tert*-Butanol	75-65-0	1
357.	(*235*)	Butylamine	109-73-9	1
358.	(*236*)	*N*-(*n*-Butyl)aniline	1126-78-9	1
359.	(*243*)	4-*tert*-Butylcatéchol	98-29-3	1
360.	(*248*)	*N*-(*n*-Butyl)imidazole	4316-42-1	1
361.	(*252*)	Butylmercaptan	109-79-5	1
362.	(*255*)	*m*-Butylphénol	4074-43-5	1
363.	(*256*)	*o*-Butylphénol	3180-09-4	1
364.	(*257*)	*o*-*sec*-Butylphénol	89-72-5	1
365.	(*259*)	*p*-Butylphénol	1638-22-8	1
366.	(*258*)	4-*tert*-Butylphénol	98-54-4	1
367.	(*262*)	*m*-Butyltoluène	1595-04-6	1
368.	(*263*)	*o*-Butyltoluène	1595-11-5	1
369.	(*264*)	*p*-Butyltoluène	1595-05-7	1
370.	(*265*)	*p*-*tert*-Butyltoluène	98-51-1	1
371.	(*266*)	Butyltrichlorosilane	7521-80-4	1
372.	(*267*)	Butyraldéhyde	123-72-8	1
373.	(*703*)	Butyrate d'éthyle	105-54-4	1
374.	(*885*)	Butyrate d'isoamyle	106-27-4	1
375.	(*1026*)	Butyrate de méthyle	623-42-7	1
376.	(*270*)	béta-Butyrolactone	3068-88-0	1
377.	(*271*)	Butyronitrile	109-74-0	1
378.	(*287*)	Cadmium élémentaire	7440-43-9	0,1
379.	(*292*)	Cadmium, sels, n.s.a.***	—	1
380.	(*305*)	(+)-Camphre	464-49-3	1
381.	(*307*)	Caprolactame	105-60-2	1
382.	(*308*)	Caprolactone	502-44-3	1
383.	(*858*)	Carbamate de *beta*-hydroxyéthyle	5395-01-7	1
384.	(*141*)	Carbonate de baryum	513-77-9	0,1
385.	(*284*)	Carbonate de cadmium	513-78-0	1
386.	(*323*)	Carbonate de césium	534-17-8	1
387.	(*970*)	Carbonate de manganèse	598-62-9	0,1
388.	(*1122*)	Carbonate de nickel (II)	3333-67-3	0,1
389.	(*932*)	Carbonate de plomb	598-63-0	0,1
390.	(*1329*)	Carbonate de potassium	584-08-7	1
391.	(*1358*)	Carbonate de propylène	108-32-7	1
392.	(*1431*)	Carbonate de sodium	497-19-8	1
393.	(*1540*)	Carbonate de thallium(I)	6533-73-9	1
394.	(*317*)	Carvacrol	499-75-2	1
395.	(*319*)	Catéchol	120-80-9	1
396.	(*321*)	alpha-Cédrène	469-61-4	1
397.	(*920*)	Cétène	463-51-4	1
398.	(*1089*)	Cétone de Michler	90-94-8	0,1
399.	(*328*)	Chloral	75-87-6	1
400.	(*329*)	Chloramine-T	127-65-1	0,1
401.	(*332*)	Chlore	7782-50-5	1
402.	(*712*)	Chlorhydrine d'éthylène	107-07-3	1
403.	(*1432*)	Chlorite de sodium	7758-19-2	1
404.	(*336*)	Chloroacétaldéhyde	107-20-0	1
405.	(*337*)	2-Chloroacétamide	79-07-2	1
406.	(*706*)	Chloroacétate d'éthyle	105-39-5	1
407.	(*1686*)	Chloroacétate de vinyle	2549-51-1	1
408.	(*339*)	Chloroacétonitrile	107-14-2	1
409.	(*340*)	Chloroacétophénone	532-27-4	1
410.	(*342*)	3-Chloro-4-aminoaniline	615-66-7	1
411.	(*343*)	*m*-Chloroaniline	108-42-9	1
412.	(*344*)	*p*-Chloroaniline	106-47-8	1
413.	(*345*)	*p*-Chloro-*o*-anisidine	93-50-5	1
414.	(*346*)	Chlorobenzène	108-90-7	1
415.	(*347*)	*p*-Chlorobenzène sulfonate de sodium	5138-90-9	1
416.	(*350*)	*o*-Chlorobenzylidènemalononitrile	2698-41-1	1
417.	(*361*)	Chlorobiphényle (chlore à 42 %) (PCB)	53469-21-9	0,1
418.	(*351*)	Chlorobromométhane	74-97-5	1
419.	(*352*)	1-Chloro-3-bromopropane	109-70-6	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

Article		Colonne I Ingrédient		Colonne II
		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
420.	(*1028*)	Chlorocarbonate de méthyle	79-22-1	1
421.	(*353*)	Chloro-*m*-crésol, tous les isomères	—	1
422.	(*354*)	Chloro-*o*-crésol, tous les isomères	—	1
423.	(*355*)	Chloro-*p*-crésol, tous les isomères	—	1
424.	(*356*)	4-Chloro-2-cyclopentylphénol	13347-42-7	1
425.	(*357*)	Chlorodifluoroéthane (FC 142)	75-68-3	1
426.	(*358*)	Chlorodifluorométhane (FC 22)	75-45-6	1
427.	(*359*)	3-Chloro-1,2-dihydroxypropane	96-24-2	1
428.	(*360*)	Chlorodinitrobenzène, tous les isomères	—	1
429.	(*363*)	Chloroforme	67-66-3	0,1
430.	(*34*)	Chloroformiate d'allyle	2937-50-0	1
431.	(*172*)	Chloroformiate de benzyle	501-53-1	1
432.	(*245*)	Chloroformiate de *tert*-butylcyclo-hexyle	70042-58-9	1
433.	(*244*)	Chloroformiate de *n*-butyle	592-34-7	1
434.	(*366*)	Chloroformiate de chlorométhyle	22128-62-7	1
435.	(*462*)	Chloroformiate de cyclobutyle	81228-87-7	1
436.	(*707*)	Chloroformiate d'éthyle	541-41-3	1
437.	(*736*)	Chloroformiate de 2-éthylhexyle	24468-13-1	1
438.	(*910*)	Chloroformiate d'isopropyle	108-23-6	1
439.	(*1268*)	Chloroformiate de phényle	1885-14-9	1
440.	(*1357*)	Chloroformiate de *n*-propyle	109-61-5	1
441.	(*364*)	Chloroformiates, n.s.a.***	—	1
442.	(*1359*)	Chlorohydrine de propylène	78-89-7	1
443.	(*365*)	Chloro(*o*-hydroxyphényl)mercure	90-03-9	1
444.	(*369*)	Chloronitroaniline, tous les isomères	—	1
445.	(*371*)	1-Chloro-1-nitropropane	600-25-9	1
446.	(*372*)	4-Chloro-3-nitrotoluène	89-60-1	1
447.	(*89*)	Chloropalladate d'ammonium	19168-23-1	1
448.	(*1340*)	Chloropalladate de potassium	10025-98-6	1
449.	(*90*)	Chloropalladite d'ammonium	13820-40-1	1
450.	(*373*)	Chloropentafluoroéthane (FC 115)	76-15-3	1
451.	(*374*)	*m*-Chlorophénol	108-43-0	1
452.	(*375*)	*o*-Chlorophénol	95-57-8	1
453.	(*376*)	*p*-Chlorophénol	106-48-9	1
454.	(*377*)	Chlorophényltrichlorosilane	26571-79-9	1
455.	(*378*)	Chloropicrine	76-06-2	0,1
456.	(*91*)	Chloroplatinate d'ammonium	16919-58-7	0,1
457.	(*380*)	Chloroprène	126-99-8	0,1
458.	(*381*)	3-Chloro-1-propanol	627-30-5	1
459.	(*382*)	*o*-Chlorostyrène	2039-87-4	1
460.	(*708*)	Chlorothioformiate d'éthyle	2812-73-9	1
461.	(*384*)	*p*-Chlorothiophénol	106-54-7	1
462.	(*385*)	*o*-Chlorotoluène	95-49-8	1
463.	(*386*)	Chloro-*m*-toluidine	—	1
464.	(*387*)	Chloro-*o*-toluidine	—	1
465.	(*388*)	4-Chloro-*o*-toluidine	95-69-2	1
466.	(*389*)	4-Chloro-*o*-toluidine, chlorhydrate de	3165-93-3	1
467.	(*390*)	Chloro-*p*-toluidine	—	1
468.	(*461*)	Chlorure cyanurique	108-77-0	1
469.	(*33*)	Chlorure d'allyle	107-05-1	1
470.	(*46*)	Chlorure d'aluminium	7446-70-0	1
471.	(*88*)	Chlorure d'ammonium	12125-02-9	1
472.	(*118*)	Chlorure d'anisoyle	100-07-2	1
473.	(*142*)	Chlorure de baryum	10361-37-2	1
474.	(*156*)	Chlorure de benzènesulfonyle	98-09-9	1
475.	(*154*)	Chlorure de benzènethiophosphonyle	14684-25-4	1
476.	(*167*)	Chlorure de benzoyle	98-88-4	1
477.	(*171*)	Chlorure de benzyle	100-44-7	1
478.	(*166*)	Chlorure de benzylidyne	98-07-7	0,1
479.	(*180*)	Chlorure de béryllium	7787-47-5	0,1
480.	(*212*)	Chlorure de brome	13863-41-7	1
481.	(*272*)	Chlorure de butyryle	141-75-3	1
482.	(*285*)	Chlorure de cadmium	10108-64-2	0,1
483.	(*324*)	Chlorure de césium	7647-17-8	1
484.	(*341*)	Chlorure de chloroacétyle	79-04-9	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
485.	(*349*)	Chlorure de *p*-chlorobenzyle	104-83-6	1
486.	(*394*)	Chlorure de chrome (III)	10025-73-7	1
487.	(*404*)	Chlorure de chromyle	14977-61-8	1
488.	(*415*)	Chlorure de cobalt (II)	7646-79-9	0,1
489.	(*429*)	Chlorure de cuivre (I)	7758-89-6	1
490.	(*430*)	Chlorure de cuivre (II)	1344-67-8	1
491.	(*460*)	Chlorure de cyanogène	506-77-4	1
492.	(*531*)	Chlorure de dichloroacétyle	79-36-7	1
493.	(*597*)	Chlorure de diéthylthiophosphoryle	2524-04-1	1
494.	(*624*)	Chlorure de *N,N*-diméthylcarbanyle	79-44-7	0,1
495.	(*638*)	Chlorure de diméthylthiophosphoryle	—	1
496.	(*1569*)	Chlorure d'étain(II)	7772-99-8	1
497.	(*705*)	Chlorure d'éthyle	75-00-3	1
498.	(*715*)	Chlorure d'éthylène (1,2-dichloroéthane)	107-06-2	1
499.	(*750*)	Chlorure d'éthylphosphoneux	1498-40-4	1
500.	(*785*)	Chlorure de fumaryle	627-63-4	1
501.	(*790*)	Chlorure de gallium (III)	13450-90-3	1
502.	(*845*)	Chlorure d'hydrogène	7647-01-0	1
503.	(*893*)	Chlorure d'isobutyryle	79-30-1	1
504.	(*902*)	Chlorure d'isophtalyle	99-63-8	1
505.	(*971*)	Chlorure de manganèse (II)	7773-01-5	0,1
506.	(*978*)	Chlorure de mercure (II) ammoniacal	10124-48-8	1
507.	(*1027*)	Chlorure de méthyle	74-87-3	1
508.	(*1044*)	Chlorure de méthylène	75-09-2	0,1
509.	(*1071*)	Chlorure de méthylphosphoneux	676-83-5	1
510.	(*1070*)	Chlorure de méthylphosphonothioique	676-98-2	1
511.	(*1124*)	Chlorure de nickel (II)	7718-54-9	0,1
512.	(*1205*)	Chlorure de nitrosyle	2696-92-6	1
513.	(*1233*)	Chlorure de palladium (II)	7647-10-1	1
514.	(*41*)	Chlorure de palladium et d'allyle, dimère	12012-95-2	1
515.	(*192*)	Chlorure de palladium (II) bis(di(bêta-chloroéthyl)sulfure)	64047-28-5	1
516.	(*1265*)	Chlorure de phénylacétyle	103-80-0	1
517.	(*1267*)	Chlorure de phénylcarbylamine	622-44-6	1
518.	(*1284*)	Chlorure de phénylphosphoreux	644-97-3	1
519.	(*1316*)	Chlorure de pivalyle	3282-30-2	1
520.	(*1317*)	Chlorure de platine (II)	10025-65-7	0,1
521.	(*933*)	Chlorure de plomb	7758-95-4	0,1
522.	(*1353*)	Chlorure de propionyle	79-03-8	1
523.	(*1376*)	Chlorure de pyrosulfuryle	7791-27-7	1
524.	(*1387*)	Chlorure de rubidium	7791-11-9	1
525.	(*1481*)	Chlorure de soufre	10025-67-9	1
526.	(*1469*)	Chlorure de strontium	10476-85-4	1
527.	(*1490*)	Chlorure de sulfuryle	7791-25-5	1
528.	(*1499*)	Chlorure de terbium	10042-88-3	1
529.	(*1541*)	Chlorure de thallium	7791-12-0	1
530.	(*1561*)	Chlorure de thionyle	7719-09-7	1
531.	(*1564*)	Chlorure de thiophosphoryle	3982-91-0	1
532.	(*1567*)	Chlorure de thulium	13537-18-3	1
533.	(*1599*)	Chlorure de tributylétain	1461-22-9	1
534.	(*1604*)	Chlorure de trichloroacétyle	76-02-8	1
535.	(*1650*)	Chlorure de triméthylétain	1066-45-1	0,1
536.	(*1656*)	Chlorure de triphénylétain	639-58-7	1
537.	(*1673*)	Chlorure de valéryle	638-29-9	1
538.	(*1685*)	Chlorure de vinyle	75-01-4	0,1
539.	(*1689*)	Chlorure de vinylidène	75-35-4	1
540.	(*1703*)	Chlorure d'ytterbium	10361-91-8	1
541.	(*1709*)	Chlorure de zinc	7646-85-7	1
542.	(*765*)	Chlorure ferreux	7758-94-3	1
543.	(*987*)	Chlorure mercureux	7546-30-7	1
544.	(*980*)	Chlorure mercurique	7487-94-7	0,1
545.	(*1463*)	Chlorure stanneux, dihydrate	10025-69-1	1
546.	(*92*)	Chromate d'ammonium	7788-98-9	1
547.	(*143*)	Chromate de baryum	10294-40-3	0,1
548.	(*299*)	Chromate de calcium	13765-19-0	0,1
549.	(*395*)	Chromate de chrome (III)	24613-89-6	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
550.	(*934*)	Chromate de plomb	7758-97-6	0,1
551.	(*1330*)	Chromate de potassium	7789-00-6	1
552.	(*1433*)	Chromate de sodium	7775-11-3	1
553.	(*1470*)	Chromate de strontium	7789-06-2	0,1
554.	(*1710*)	Chromate de zinc	13530-65-9	0,1
555.	(*148*)	Chromate de zinc	50922-29-7	0,1
556.	(*935*)	Chromate/oxyde de plomb	18454-12-1	0,1
557.	(*393*)	Chrome-carbonyle	13007-92-6	1
558.	(*396*)	Chrome (II), composés, n.s.a.***	—	1
559.	(*397*)	Chrome (III), composés, n.s.a.***	—	1
560.	(*398*)	Chrome (VI), composés, n.s.a.***	—	1
561.	(*399*)	Chrome élémentaire	7440-47-3	0,1
562.	(*405*)	Chrysène	218-01-9	0,1
563.	(*407*)	Cinnamaldéhyde	104-55-2	0,1
564.	(*408*)	Citral	5392-40-5	1
565.	(*414*)	Cobalt-carbonyle	10210-68-1	1
566.	(*417*)	Cobalt élémentaire	7440-48-4	0,1
567.	(*421*)	Cobalt-hydrocarbonyle	16842-03-8	1
568.	(*441*)	Corindon	1302-74-5	1
569.	(*442*)	*p*-Crésidine	120-71-8	0,1
570.	(*443*)	Crésol	1319-77-3	1
571.	(*444*)	*m*-Crésol	108-39-4	1
572.	(*445*)	*o*-Crésol	95-48-7	1
573.	(*446*)	*p*-Crésol	106-44-5	1
574.	(*448*)	Crotonaldéhyde	4170-30-3	1
575.	(*449*)	(E)-Crotonaldéhyde	123-73-9	1
576.	(*709*)	Crotonate d'éthyle	623-70-1	1
577.	(*431*)	Cuivre, composés, n.s.a.***	—	1
578.	(*433*)	Cuivre élémentaire	7440-50-8	1
579.	(*452*)	Cupferron	135-20-6	0,1
580.	(*454*)	Cupriéthylènediamine	13426-91-0	1
581.	(*455*)	Cyanamide	420-04-2	1
582.	(*300*)	Cyanamide de calcium	156-62-7	1
583.	(*35*)	Cyanoacétate d'allyle	13361-32-5	1
584.	(*711*)	Cyanoacétate d'éthyle	105-56-6	1
585.	(*1033*)	Cyanoacrylate de méthyle	137-05-3	1
586.	(*458*)	Cyanogène	460-19-5	1
587.	(*1413*)	Cyanure d'argent	506-64-9	1
588.	(*1418*)	Cyanure d'argent et de potassium	506-61-6	1
589.	(*218*)	Cyanure de bromobenzyle, tous les isomères	—	1
590.	(*456*)	Cyanure, composés minéraux, n.s.a.***	—	1
591.	(*453*)	Cyanure cuivrique	14763-77-0	1
592.	(*710*)	Cyanure d'éthyle	107-12-0	1
593.	(*846*)	Cyanure d'hydrogène	74-90-8	1
594.	(*1125*)	Cyanure de nickel	557-19-7	1
595.	(*1137*)	Cyanure de nickel et de potassium	14220-17-8	0,1
596.	(*1711*)	Cyanure de zinc	557-21-1	1
597.	(*1721*)	Cyanure de zinc et de potassium	14244-62-3	1
598.	(*981*)	Cyanure mercurique	592-04-1	1
599.	(*463*)	1,5,9-Cyclododécatriène	4904-61-4	1
600.	(*464*)	Cycloheptatriène	544-25-2	1
601.	(*465*)	Cyclohexane	110-82-7	1
602.	(*466*)	Cyclohexanol	108-93-0	1
603.	(*467*)	Cyclohexanone	108-94-1	0,1
604.	(*469*)	Cyclohexène	110-83-8	1
605.	(*470*)	Cyclohexényltrichlorosilane	10137-69-6	1
606.	(*472*)	Cyclohexylamine	108-91-8	0,1
607.	(*473*)	*N*-Cyclohexyl-2-benzothiazole-sulfénamide	95-33-0	1
608.	(*475*)	Cyclohexyltrichlorosilane	98-12-4	1
609.	(*476*)	1,3-Cyclopentadiène	542-92-7	1
610.	(*477*)	Cyclopentane	287-92-3	1
611.	(*478*)	Cyclopentanone	120-92-3	1
612.	(*479*)	*p*-Cymène	99-87-6	1
613.	(*480*)	Cytochalasine B	14930-96-2	1
614.	(*481*)	Décaborane	17702-41-9	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
615.	(*482*)	1-Décanol	112-30-1	1
616.	(*1434*)	Décylbenzènesulfonate de sodium	1322-98-1	1
617.	(*1435*)	Déhydroacétate de sodium	4418-26-2	1
618.	(*519*)	Diacétate de dibutylétain	1067-33-0	1
619.	(*1072*)	Diacétate de 2-méthyl-2-propène-1,1-diol	10476-95-6	1
620.	(*1119*)	Diacrylate de néopentyle et de glycol	2223-82-7	1
621.	(*486*)	2,4-Diaminoanisole	615-05-4	1
622.	(*488*)	1,4-Diaminoanthraquinone	128-95-0	1
623.	(*489*)	4,4'-Diaminodiphénylméthane (MDA)	101-77-9	0,1
624.	(*490*)	2,4-Diaminophénol, dichlorhydrate de	137-09-7	0,1
625.	(*491*)	1,3-Diaminopropane	109-76-2	1
626.	(*492*)	2,5-Diaminotoluène	95-70-5	1
627.	(*493*)	Diamminedichloropalladium	14323-43-4	1
628.	(*494*)	*cis*-Diamminedichloropalladium(II)	15684-18-1	1
629.	(*495*)	*cis*-Diamminedichloroplatine(II)	15663-27-1	0,1
630.	(*496*)	Di-*n*-amylamine	2050-92-2	1
631.	(*497*)	Diazométhane	334-88-3	0,1
632.	(*500*)	4,4'-Dibenzamido-1,1'-dianthrimide	128-79-0	1
633.	(*502*)	4,4'-Dibenzanthronyle	116-90-5	1
634.	(*498*)	Dibenzo(*a,h*)acridine	226-36-8	0,1
635.	(*499*)	Dibenzo(*a,j*)acridine	224-42-0	0,1
636.	(*501*)	Dibenzo(*a,h*)anthracène	53-70-3	0,1
637.	(*503*)	7H-Dibenzo(*c,g*)carbazole	194-59-2	0,1
638.	(*504*)	Dibenzo(*a,h*)pyrène	189-64-0	0,1
639.	(*505*)	Dibenzo(*a,i*)pyrène	189-55-9	0,1
640.	(*506*)	Dibenzo(*a,l*)pyrène	191-30-0	1
641.	(*509*)	Diborane	19287-45-7	1
642.	(*510*)	1,2-Dibromo-3-butanone	25109-57-3	1
643.	(*511*)	1,2-Dibromo-3-chloropropane	96-12-8	0,1
644.	(*512*)	Dibromométhane	74-95-3	1
645.	(*513*)	1,2-Dibromopropane	78-75-1	1
646.	(*514*)	Di(*n*-butyl)amine	111-92-2	1
647.	(*515*)	*N,N*-Di-*n*-butylaminoéthanol	102-81-8	1
648.	(*612*)	Dicétène	674-82-8	1
649.	(*529*)	Dichloroacétaldéhyde	79-02-7	1
650.	(*530*)	1,3-Dichloroacétone	534-07-6	1
651.	(*532*)	Dichloroacétylène	7572-29-4	1
652.	(*533*)	Dichloroaniline, tous les isomères	—	1
653.	(*534*)	3,4-Dichloroaniline	95-76-1	1
654.	(*535*)	*m*-Dichlorobenzène	541-73-1	1
655.	(*536*)	*o*-Dichlorobenzène	95-50-1	1
656.	(*537*)	*p*-Dichlorobenzène	106-46-7	1
657.	(*538*)	3,3'-Dichlorobenzidine	91-94-1	0,1
658.	(*539*)	1,1-Dichloro-2,2-bis (*p*-chlorophényl)éthylène	72-55-9	1
659.	(*540*)	Dichlorobutène	11069-19-5	1
660.	(*541*)	1,4-Dichloro-2-butène	764-41-0	1
661.	(*542*)	3,4-Dichloro-1-butène	760-23-6	0,1
662.	(*543*)	Dichlorodifluorométhane (FC 12)	75-71-8	1
663.	(*544*)	1,3-Dichloro-5,5-diméthylhydantoïne	118-52-5	1
664.	(*545*)	1,1-Dichloroéthane	75-34-3	1
665.	(*546*)	*sym*-Dichloroéthylène	540-59-0	1
666.	(*548*)	Dichloroisocyanurate de potassium	2244-21-5	1
667.	(*549*)	Dichloroisocyanurate de sodium	2893-78-9	1
668.	(*551*)	Dichloromonofluorométhane (FC 21)	75-43-4	1
669.	(*552*)	2,6-Dichloro-4-nitroaniline	99-30-9	1
670.	(*553*)	2,5-Dichloronitrobenzène	89-61-2	1
671.	(*554*)	3,4-Dichloronitrobenzène	99-54-7	1
672.	(*555*)	1,1-Dichloro-1-nitroéthane	594-72-9	1
673.	(*556*)	Dichlorophène	97-23-4	1
674.	(*557*)	2,6-Dichlorophénol	87-65-0	1
675.	(*559*)	Dichlorophényltrichlorosilane	27137-85-5	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
676.	(*560*)	1,3-Dichloro-2-propanol	96-23-1	1
677.	(*561*)	Dichloropropène	542-75-6	1
678.	(*562*)	Dichlorosilane	4109-96-0	1
679.	(*563*)	1,2-Dichloro-1,1,2,2-tétrafluoroéthane	76-14-2	1
680.	(*564*)	Dichlorotriphénylantimoine	594-31-0	1
681.	(*173*)	Dichlorure de benzyle	98-87-3	1
682.	(*525*)	Dichlorure de dibutylétain	683-18-1	1
683.	(*1361*)	Dichlorure de propylène	78-87-5	1
684.	(*1482*)	Dichlorure de soufre	10545-99-0	1
685.	(*1576*)	Dichlorure de titanocène	1271-19-8	1
686.	(*93*)	Dichromate d'ammonium	7789-09-5	1
687.	(*1331*)	Dichromate de potassium	7778-50-9	0,1
688.	(*1436*)	Dichromate de sodium	10588-01-9	1
689.	(*1712*)	Dichromate de zinc	14018-95-2	0,1
690.	(*565*)	Dicyclohexylamine	101-83-7	0,1
691.	(*567*)	Dicyclopentadiène	77-73-6	1
692.	(*568*)	Diépoxybutane	1464-53-5	0,1
693.	(*569*)	Diéthanolamine	111-42-2	1
694.	(*571*)	Diéthylamine	109-89-7	1
695.	(*572*)	Diéthylaminoéthanol	100-37-8	1
696.	(*574*)	3-(Diéthylamino)propylamine	104-78-9	1
697.	(*575*)	*N*,*N*-Diéthylaniline	91-66-7	1
698.	(*576*)	Diéthylbenzène	25340-17-4	1
699.	(*577*)	Diéthylcarbinol	584-02-1	1
700.	(*592*)	Diéthylcétone	96-22-0	1
701.	(*578*)	Diéthyldichlorosilane	1719-53-5	1
702.	(*286*)	Diéthyldithiocarbamate de cadmium	14239-68-0	1
703.	(*1713*)	*N*,*N*-Diéthyldithiocarbamate de zinc	14324-55-1	1
704.	(*586*)	Diéthylènetriamine	111-40-0	0,1
705.	(*521*)	Di(2-éthylhexanoate) de di-*n*-butylétain	2781-10-4	1
706.	(*587*)	Di(2-éthylhexyl)amine	106-20-7	1
707.	(*591*)	1,2-Diéthylhydrazine	1615-80-1	0,1
708.	(*593*)	Diéthylmercure	627-44-1	0,1
709.	(*598*)	Difluorodibromométhane	75-61-6	1
710.	(*1231*)	Difluorure d'oxygène	7783-41-7	1
711.	(*717*)	Diformiate d'éthylèneglycol	629-15-2	1
712.	(*602*)	1,4-Dihydroxy-9,10-anthracènedione	81-64-1	1
713.	(*603*)	1,2-Dihydroxyanthraquinone	72-48-0	1
714.	(*604*)	1,8-Dihydroxyanthraquinone	117-10-2	1
715.	(*605*)	2,4-Dihydroxybenzophénone	131-56-6	1
716.	(*607*)	Diisobutylcétone	108-83-8	1
717.	(*663*)	Diisocyanate de 4,4'-diphénylméthane	101-68-8	0,1
718.	(*900*)	Diisocyanate d'isophorone	4098-71-9	0,1
719.	(*1646*)	Diisocyanate de triméthylhexaméthylène	28679-16-5	0,1
720.	(*609*)	Diisopropanolamine	110-97-4	1
721.	(*610*)	Diisopropylamine	108-18-9	1
722.	(*611*)	*N*,*N*-Diisopropyléthanolamine	96-80-0	1
723.	(*522*)	Dilaurate de dibutylétain	77-58-7	1
724.	(*225*)	Diméthacrylate de 1,4-butanediol	2082-81-7	1
725.	(*580*)	Diméthacrylate de diéthylèneglycol	2358-84-1	1
726.	(*1626*)	Diméthacrylate de triéthylèneglycol	109-16-0	1
727.	(*614*)	3,3'-Diméthoxybenzidine	119-90-4	0,1
728.	(*615*)	*N*,*N*-Diméthylacétamide	127-19-5	1
729.	(*616*)	Diméthylamine	124-40-3	1
730.	(*617*)	2-Diméthylaminoacétonitrile	926-64-7	1
731.	(*618*)	4-Diméthylaminoazobenzène	60-11-7	0,1
732.	(*619*)	3-Diméthylamino-*N*,*N*-diméthylpropionamide	17268-47-2	1
733.	(*621*)	*N*,*N*-Diméthylaniline	121-69-7	1
734.	(*622*)	7,12-Dimethylbenzo(a)anthracène	57-97-6	0,1
735.	(*623*)	2,3-Diméthylbutane	79-29-8	1
736.	(*625*)	*N*,*N*-Diméthylcyclohexylamine	98-94-2	1
737.	(*626*)	Diméthyldichlorosilane	75-78-5	1
738.	(*627*)	Diméthyldiéthoxysilane	78-62-6	1
739.	(*432*)	Diméthyldithiocarbamate de cuivre(II)	137-29-1	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
740.	(*936*)	*N,N'*-Diméthyldithiocarbamate de plomb	19010-66-3	1
741.	(*628*)	*N,N*-Diméthylformamide	68-12-2	1
742.	(*629*)	1,1-Diméthylhydrazine	57-14-7	0,1
743.	(*630*)	1,2-Diméthylhydrazine	540-73-8	1
744.	(*631*)	Diméthylmercure	593-74-8	0,1
745.	(*635*)	Diméthylpropylamine	926-63-6	1
746.	(*637*)	Diméthyl sulfinone (diméthyl sufoxyde)	67-68-5	1
747.	(*523*)	Di(monobutyl)maléate de di-*n*-butylétain	15546-16-4	1
748.	(*639*)	*N,N'*-Di-bêta-naphthyl-*p*-phénylènediamine	93-46-9	1
749.	(*718*)	Dinitrate d'éthylèneglycol	628-96-6	1
750.	(*1234*)	Dinitrate de palladium	10102-05-3	1
751.	(*1363*)	Dinitrate de 1,2-propylèneglycol	6423-43-4	1
752.	(*640*)	Dinitroaniline, tous les isomères	—	1
753.	(*641*)	2,4-Dinitroaniline	97-02-9	1
754.	(*642*)	*m*-Dinitrobenzène	99-65-0	1
755.	(*643*)	*o*-Dinitrobenzène	528-29-0	1
756.	(*644*)	*p*-Dinitrobenzène	100-25-4	1
757.	(*645*)	4,6-Dinitro-*o*-crésol	534-52-1	1
758.	(*94*)	Dinitro-*o*-crésolate d'ammonium	29595-25-3	1
759.	(*1437*)	Dinitro-*o*-crésolate de sodium	25641-53-6	1
760.	(*646*)	Dinitrophénol, tous les isomères (sauf le 2,4-dinitrophénol)	—	1
761.	(*647*)	2,4-Dinitrophénol	51-28-5	0,1
762.	(*648*)	2,4-Dinitrophénylhydrazine	119-26-6	1
763.	(*649*)	Dinitrosopentaméthylènetétramine	101-25-7	1
764.	(*650*)	1,4-Dinitrosopipérazine	140-79-4	0,1
765.	(*651*)	Dinitrotoluène, tous les isomères	—	1
766.	(*652*)	2,4-Dinitrotoluène	121-14-2	1
767.	(*655*)	1,4-Dioxane	123-91-1	0,1
768.	(*656*)	1,3-Dioxolane	646-66-0	1
769.	(*1175*)	Dioxyde d'azote	10102-44-0	1
770.	(*310*)	Dioxyde de carbone	124-38-9	1
771.	(*333*)	Dioxyde de chlore	10049-04-4	1
772.	(*1396*)	Dioxyde de sélénium (IV)	7446-08-4	1
773.	(*1483*)	Dioxyde de soufre	7446-09-5	1
774.	(*1495*)	Dioxyde de tellure	7446-07-3	1
775.	(*1688*)	Dioxyde de vinylcyclohexène	106-87-6	0,1
776.	(*1708*)	Di(pentachlorophénate) de zinc	117-97-5	1
777.	(*657*)	Dipentène	138-86-3	1
778.	(*659*)	*N,N*,-Diphénylamine	122-39-4	0,1
779.	(*660*)	Diphényldichlorosilane	80-10-4	1
780.	(*658*)	Diphényle	92-52-4	1
781.	(*662*)	Diphénylmercure	587-85-9	1
782.	(*665*)	*N,N'*-Diphényl-*p*-phénylènediamine	74-31-7	0,1
783.	(*670*)	Dipropylcétone	123-19-3	1
784.	(*1270*)	Diséléniure de phényle	1666-13-3	1
785.	(*524*)	Distéarate de dibutylétain	5847-55-2	1
786.	(*42*)	Disulfure d'allyle et de propyle	2179-59-1	1
787.	(*311*)	Disulfure de carbone	75-15-0	0,1
788.	(*416*)	Disulfure de cobalt	12013-10-4	1
789.	(*507*)	Disulfure de 2,2'-dibenzothiazyle	120-78-5	1
790.	(*508*)	Disulfure de dibenzyle	150-60-7	1
791.	(*528*)	Disulfure de dibutylétain	4253-22-9	1
792.	(*1397*)	Disulfure de sélénium (IV)	7488-56-4	0,1
793.	(*1520*)	Disulfure de tétraéthylthiurame	97-77-8	1
794.	(*678*)	*m*-Divinylbenzène	108-57-6	1
795.	(*1438*)	Dodécylbenzènesulfonate de sodium	25155-30-0	1
796.	(*680*)	alpha-(Dodécylphényl)-omega-hydroxy-poly(oxy-1,2-éthanediyle)	9014-92-0	1
797.	(*681*)	Dodécyltrichlorosilane	4484-72-4	1
798.	(*676*)	EDTA de disodium et de calcium	62-33-9	0,1
799.	(*761*)	EDTA ferrique	17099-81-9	1
800.	(*682*)	Épibromhydrine	3132-64-7	1
801.	(*683*)	Épichlorhydrine	106-89-8	0,1
802.	(*793*)	Essence	8006-61-9	1
803.	(*1570*)	Étain, composés, n.s.a.***	—	1
804.	(*1571*)	Étain élémentaire	7440-31-5	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I		Colonne II
		Ingrédient		
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
805.	(*684*)	Éthanol	64-17-5	0,1
806.	(*36*)	Éther d'allyle et d'éthyle	557-31-3	1
807.	(*38*)	Éther d'allyle et de glycidyle	106-92-3	0,1
808.	(*175*)	Éther de benzyle	103-50-4	1
809.	(*200*)	Éther de bisphénol A et de diglycidyle	1675-54-3	1
810.	(*246*)	Éther de butyle et de glycidyle	2426-08-6	0,1
811.	(*322*)	Éther de cédrol et de méthyle	67874-81-1	1
812.	(*367*)	Éther de chlorométhyle et d'éthyle	3188-13-4	1
813.	(*579*)	Éther de diéthylèneglycol et de diéthyle	112-36-7	1
814.	(*581*)	Éther de diéthylèneglycol et de monobutyle	112-34-5	1
815.	(*582*)	Éther de diéthylèneglycol et de monoéthyle	111-90-0	1
816.	(*583*)	Éther de diéthylèneglycol et de monohexyle	112-59-4	1
817.	(*584*)	Éther de diéthylèneglycol et de monométhyle	111-77-3	1
818.	(*585*)	Éther de diéthylèneglycol et de monophényle	104-68-7	1
819.	(*600*)	Éther de diglycidyle	2238-07-5	0,1
820.	(*661*)	Éther de diphényle	101-84-8	1
821.	(*669*)	Éther de dipropylèneglycol et de méthyle	34590-94-8	1
822.	(*719*)	Éther d'éthylèneglycol et d'isopropyle	109-59-1	1
823.	(*720*)	Éther d'éthylèneglycol et de monobenzyle	622-08-2	1
824.	(*721*)	Éther d'éthylèneglycol et de monobutyle	111-76-2	1
825.	(*723*)	Éther d'éthylèneglycol et de monophényle	122-99-6	1
826.	(*912*)	Éther d'isopropyle et de glycidyle	4016-14-2	1
827.	(*1029*)	Éther de méthyle et de chlorométhyle	107-30-2	0,1
828.	(*1111*)	Éther de bêta-naphtol et d'éthyle	93-18-5	1
829.	(*1275*)	Éther de phényle et de glycidyle	122-60-1	0,1
830.	(*1324*)	Éther de polyéthylèneglycol et de monooléyle	9004-98-2	1
831.	(*1325*)	Éther de polyéthylèneglycol et d'octylphénol	9002-93-1	1
832.	(*1326*)	Éther de polyéthylèneglycol et d'octylphényle	9036-19-5	1
833.	(*1364*)	Éther de propylène glycol et de monométhyle	107-98-2	1
834.	(*1380*)	Éther de résorcinol et de diglycidyle	101-90-6	1
835.	(*1627*)	Éther de triéthylèneglycol et de monobutyle	143-22-6	1
836.	(*1687*)	Éther de vinyle et de 2-chloroéthyle	110-75-8	1
837.	(*485*)	Éther diallylique	557-40-4	1
838.	(*547*)	Éther dichloroéthylique	111-44-4	1
839.	(*550*)	Éther dichloroisopropylique	108-60-1	1
840.	(*190*)	Éther di(2-chloroisopropylique)	39638-32-9	1
841.	(*191*)	Éther di(chlorométhylique)	542-88-1	0,1
842.	(*853*)	Éther diméthylique de l'hydroquinone	150-78-7	1
843.	(*838*)	Éther *n*-hexylique	112-58-3	1
844.	(*911*)	Éther isopropylique	108-20-3	1
845.	(*1445*)	Éthersulfate sodique de lauryle	32612-48-9	1
846.	(*685*)	2-Éthoxy-3,4-dihydro-2h-pyrane	103-75-3	1
847.	(*686*)	2-Éthoxyéthanol	110-80-5	0,1
848.	(*691*)	Éthylamine	75-04-7	1
849.	(*692*)	2-Éthylaminoéthanol	110-73-6	1
850.	(*693*)	Éthyl-*sec*-amylcétone	541-85-5	1
851.	(*694*)	Éthyl-*n*-amylcétone	106-68-3	1
852.	(*695*)	2-Éthylaniline	578-54-1	1
853.	(*696*)	*N*-Éthylaniline	103-69-5	1
854.	(*697*)	Éthylbenzène	100-41-4	0,1
855.	(*698*)	*N*-Éthyl-*N*-benzylaniline	92-59-1	1
856.	(*699*)	*N*-Éthylbenzyltoluidine, tous les isomères	—	1
857.	(*702*)	Éthylbutylcétone	106-35-4	1
858.	(*418*)	*N*,*N*'-Éthylène bis(3-fluorosalicylidèneiminato)-cobalt (II)	62207-76-5	1
859.	(*713*)	Éthylènediamine	107-15-3	0,1
860.	(*716*)	Éthylèneglycol	107-21-1	1
861.	(*724*)	Éthylène-imine	151-56-4	1
862.	(*726*)	Éthylènethio-urée	96-45-7	0,1
863.	(*727*)	Éthyl éthylique	60-29-7	1
864.	(*729*)	Éthylhexaldéhyde	123-05-7	1
865.	(*730*)	2-Éthyl-1,3-hexanediol	94-96-2	1
866.	(*735*)	2-Éthylhexylamine	104-75-6	1
867.	(*738*)	2-(2-Éthylhexyloxy)éthanol	1559-35-9	1
868.	(*739*)	5-Éthylidène-2-norbornène	16219-75-3	1
869.	(*963*)	*N*-Éthylimide de l'acide maléique	128-53-0	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (% poids/poids)
870.	(*742*)	Éthylmercaptan	75-08-1	1
871.	(*1439*)	*o*-(Éthylmercurithio)benzoate de sodium	54-64-8	0,1
872.	(*745*)	*N*-Éthylmorpholine	100-74-3	1
873.	(*749*)	Éthylphénoldichlorosilane	1125-27-5	1
874.	(*1714*)	*N*-Éthyl-*N*-phényldithiocarbamate de zinc	14634-93-6	1
875.	(*755*)	2-(Éthylthio)éthanol	110-77-0	1
876.	(*756*)	*N*-Éthyl-*m*-toluidine	102-27-2	1
877.	(*757*)	*N*-Éthyl-*o*-toluidine	94-68-8	1
878.	(*758*)	*N*-Éthyl-*p*-toluidine	622-57-1	1
879.	(*881*)	Fer-pentacarbonyle	13463-40-6	1
880.	(*763*)	Ferrocène	102-54-5	1
881.	(*764*)	Ferrosilicium	8049-17-0	1
882.	(*767*)	Ferrovanadium	12604-58-9	1
883.	(*882*)	Fer, sels hydrosolubles, n.s.a.***	—	1
884.	(*768*)	Fibre de verre	—	1
885.	(*769*)	Fluoborate, composés, n.s.a.***	—	1
886.	(*288*)	Fluoborate de cadmium	14486-19-2	1
887.	(*419*)	Fluoborate de cobalt (II)	26490-63-1	1
888.	(*1127*)	Fluoborate de nickel (II)	14708-14-6	1
889.	(*938*)	Fluoborate de plomb	13814-96-5	1
890.	(*1471*)	Fluoborate de strontium	13814-98-7	1
891.	(*774*)	Fluor	7782-41-4	1
892.	(*770*)	Fluoranthène	206-44-0	1
893.	(*771*)	Fluorapatite	1306-05-4	1
894.	(*775*)	2-Fluoroaniline	348-54-9	1
895.	(*776*)	4-Fluoroaniline	371-40-4	1
896.	(*777*)	1-Fluoro-2-bromobenzène	1072-85-1	1
897.	(*778*)	1-Fluoro-3-bromobenzène	1073-06-9	1
898.	(*939*)	Fluorosilicate de plomb	25808-74-6	1
899.	(*48*)	Fluorosulfate d'aluminium, hydrate	73680-58-7	1
900.	(*1734*)	Fluorozirconate de potassium	16923-95-8	1
901.	(*144*)	Fluorure de baryum	7787-32-8	1
902.	(*183*)	Fluorure de béryllium	7787-49-7	0,1
903.	(*315*)	Fluorure de carbonyle	353-50-4	1
904.	(*420*)	Fluorure de cobalt (II)	10026-17-2	1
905.	(*1572*)	Fluorure d'étain(II)	7783-47-3	1
906.	(*847*)	Fluorure d'hydrogène	7664-39-3	1
907.	(*954*)	Fluorure de lithium	7789-24-4	1
908.	(*958*)	Fluorure de magnésium	7783-40-6	1
909.	(*1251*)	Fluorure de perchloryle	7616-94-6	1
910.	(*1440*)	Fluorure de sodium	7681-49-4	1
911.	(*1543*)	Fluorure de thallium(I)	7789-27-7	1
912.	(*1562*)	Fluorure de thionyle	7783-42-8	1
913.	(*1715*)	Fluorure de zinc	7783-49-5	1
914.	(*52*)	Fluorure double d'aluminium et de sodium	15096-52-3	1
915.	(*773*)	Fluorures, composés minéraux, n.s.a.***	—	1
916.	(*894*)	Fluorures d'isocyanatobenzylidyne	—	1
917.	(*1128*)	Fluosilicate de nickel (II)	26043-11-8	1
918.	(*781*)	Formaldéhyde	50-00-0	0,1
919.	(*782*)	Formamide	75-12-7	0,1
920.	(*37*)	Formiate d'allyle	1838-59-1	1
921.	(*301*)	Formiate de calcium	544-17-2	1
922.	(*728*)	Formiate d'éthyle	109-94-4	1
923.	(*1048*)	Formiate de méthyle	107-31-3	1
924.	(*1129*)	Formiate de nickel	15843-02-4	0,1
925.	(*588*)	Fumarate de di(2-éthylhexyle)	141-02-6	1
926.	(*786*)	Furfural	98-01-1	1
927.	(*788*)	Furfurylfuramide (AF-2)	3688-53-7	0,1
928.	(*1050*)	2-Furoate de méthyle	611-13-2	1
929.	(*802*)	Gaiacol	90-05-1	1
930.	(*803*)	*m*-Gaiacol	150-19-6	1
931.	(*791*)	Gallium élémentaire	7440-55-3	1
932.	(*795*)	Glutaraldéhyde	111-30-8	1
933.	(*796*)	Glycidaldéhyde	765-34-4	1
934.	(*797*)	Glycidol	556-52-5	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
935.	(*799*)	Glyoxal	107-22-2	1
936.	(*804*)	Gomme adragante (ou tragacanthe)	9000-65-1	0,1
937.	(*410*)	Gourdron de houille	8007-45-2	1
938.	(*805*)	Hafnium élémentaire	7440-58-6	1
939.	(*1415*)	Heptafluorobutyrate d'argent	3794-64-7	1
940.	(*806*)	Heptane	142-82-5	1
941.	(*807*)	2-Heptanol	543-49-7	1
942.	(*808*)	3-Heptanol	589-82-2	1
943.	(*666*)	Hexabromoplatinate de dipotassium	16920-93-7	0,1
944.	(*810*)	Hexachloroacétone	116-16-5	1
945.	(*811*)	Hexachlorobenzène	118-74-1	1
946.	(*812*)	Hexachloro-1,3-butadiène	87-68-3	0,1
947.	(*813*)	Hexachlorocyclopentadiène	77-47-4	1
948.	(*814*)	Hexachloroéthane	67-72-1	1
949.	(*815*)	Hexachloronaphtalène	1335-87-1	1
950.	(*667*)	Hexachloropalladate de dipotassium	16919-73-6	1
951.	(*816*)	Hexachlorophène	70-30-4	0,1
952.	(*1333*)	Hexachloroplatinate(IV) de potassium	16921-30-5	0,1
953.	(*817*)	Hexadécyltrichlorosilane	5894-60-0	1
954.	(*818*)	Hexafluoroacétone	684-16-2	1
955.	(*819*)	Hexafluoroacétone, hydrate	10543-95-0	1
956.	(*1484*)	Hexafluorure de soufre	2551-62-4	1
957.	(*1497*)	Hexafluorure de tellure	7783-80-4	1
958.	(*821*)	Hexakis (méthoxyméthyl)mélamine	3089-11-0	1
959.	(*823*)	Hexaméthylènediamine	124-09-4	1
960.	(*824*)	Hexaméthylènediisocyanate	822-06-0	0,1
961.	(*825*)	Hexaméthylèneimine	111-49-9	1
962.	(*826*)	Hexaméthylolmélamine	531-18-0	1
963.	(*822*)	Hexaméthylphosphoramide	680-31-9	0,1
964.	(*827*)	Hexane, tous les isomères	—	1
965.	(*828*)	*n*-Hexane	110-54-3	1
966.	(*829*)	Hexanitrodiphénylamine	35860-31-2	1
967.	(*731*)	Hexanoate d'éthyle	123-66-0	1
968.	(*831*)	2-Hexanone	591-78-6	1
969.	(*836*)	*n*-Hexylamine	111-26-2	1
970.	(*837*)	Hexylèneglycol	107-41-5	1
971.	(*840*)	Hexyltrichlorosilane	928-65-4	1
972.	(*1*)	Huile de *abies alba*	8021-27-0	1
973.	(*320*)	Huile de cèdre	8000-27-9	1
974.	(*946*)	Huile de lemon-grass	8007-02-1	1
975.	(*951*)	Huile de lin	8001-26-1	1
976.	(*318*)	Huile de ricin	8001-79-4	1
977.	(*1224*)	Huile minérale	8012-95-1	1
978.	(*841*)	Hydrazine	302-01-2	0,1
979.	(*842*)	Hydrazobenzène	122-66-7	0,1
980.	(*1441*)	Hydrogénosulfure de sodium	16721-80-5	1
981.	(*247*)	Hydroperoxyde de *tert*-butyle	75-91-2	1
982.	(*450*)	Hydropéroxyde de cumène	80-15-9	1
983.	(*852*)	Hydroquinone	123-31-9	1
984.	(*237*)	Hydroxyanisole butylé (BHA)	25013-16-5	1
985.	(*428*)	Hydroxycarbonate de cuivre (II)	12069-69-1	1
986.	(*1389*)	Hydroxychlorure de ruthénium	16845-29-7	1
987.	(*1731*)	Hydroxychlorure de zirconium	10119-31-0	1
988.	(*855*)	2-Hydroxydécaline	825-51-4	1
989.	(*96*)	Hydroxyde d'ammonium	1336-21-6	1
990.	(*184*)	Hydroxyde de béryllium	13327-32-7	0,1
991.	(*302*)	Hydroxyde de calcium	1305-62-0	1
992.	(*325*)	Hydroxyde de césium	21351-79-1	1
993.	(*956*)	Hydroxyde de lithium	1310-65-2	1
994.	(*1130*)	Hydroxyde de nickel (II)	12054-48-7	0,1
995.	(*1280*)	Hydroxyde de phénylmercurique	100-57-2	1
996.	(*1335*)	Hydroxyde de potassium	1310-58-3	1
997.	(*1388*)	Hydroxyde de rubidium	1310-82-3	1
998.	(*1442*)	Hydroxyde de sodium	1310-73-2	1
999.	(*1657*)	Hydroxyde de triphénylétain	76-87-9	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I		Colonne II
		Ingrédient		
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1000.	(*1529*)	Hydroxyde de tétraméthylammonium	75-59-2	1
1001.	(*1517*)	Hydroxyde de tétraéthanolammonium	631-41-4	1
1002.	(*1716*)	Hydroxyde de zinc	20427-58-1	1
1003.	(*861*)	Hydroxylamine	7803-49-8	1
1004.	(*863*)	4-Hydroxy-3-nitroaniline	119-34-6	1
1005.	(*434*)	8-Hydroxyquinoléinate de cuivre (II)	10380-28-6	1
1006.	(*866*)	8-Hydroxyquinoléine	148-24-3	1
1007.	(*238*)	Hydroxytoluène butylé (BHT)	128-37-0	1
1008.	(*867*)	3-Hydroxy-4-(2,4-xylylazo)-2,7-naphtalènedisulfonatedisodique	3761-53-3	1
1009.	(*952*)	Hydrure d'aluminium et de lithium	16853-85-3	1
1010.	(*955*)	Hydrure de lithium	7580-67-8	1
1011.	(*1421*)	Hydrure de sodium et d'aluminium	13770-96-2	1
1012.	(*1336*)	Hypochlorite de potassium	7778-66-7	1
1013.	(*1443*)	Hypochlorite de sodium	7681-52-9	1
1014.	(*868*)	3,3'-Iminobispropylamine	56-18-8	1
1015.	(*869*)	Indane	496-11-7	1
1016.	(*870*)	Indène	95-13-6	1
1017.	(*871*)	Indéno(1,2,3-cd)pyrène	193-39-5	0,1
1018.	(*872*)	Indium, composés, n.s.a.***	—	1
1019.	(*873*)	Indium élémentaire	7440-74-6	1
1020.	(*875*)	Iode	7553-56-2	1
1021.	(*877*)	2-Iodoacétamide	144-48-9	1
1022.	(*18*)	Iodure d'acétyle	507-02-8	1
1023.	(*177*)	Iodure de benzyle	620-05-3	1
1024.	(*289*)	Iodure de cadmium	7790-80-9	1
1025.	(*848*)	Iodure d'hydrogène	10034-85-2	1
1026.	(*1053*)	Iodure de méthyle	74-88-4	0,1
1027.	(*1131*)	Iodure de nickel (II)	13462-90-3	0,1
1028.	(*1337*)	Iodure de potassium	7681-11-0	1
1029.	(*1444*)	Iodure de sodium	7681-82-5	1
1030.	(*1544*)	Iodure de thallium(I)	7790-30-9	1
1031.	(*982*)	Iodure mercurique	7774-29-0	0,1
1032.	(*887*)	Isobutanol	78-83-1	1
1033.	(*890*)	Isobutyraldéhyde	78-84-2	1
1034.	(*740*)	Isobutyrate d'éthyle	97-62-1	1
1035.	(*249*)	Isocyanate de *n*-butyle	111-36-4	0,1
1036.	(*250*)	Isocyanate de *tert*-butyle	1609-86-5	1
1037.	(*368*)	Isocyanate de 3-chloro-4-méthylphényle	28479-22-3	1
1038.	(*474*)	Isocyanate de cyclohexyle	3173-53-3	0,1
1039.	(*558*)	Isocyanate de dichlorophényle, tous les isomères	—	0,1
1040.	(*741*)	Isocyanate d'éthyle	109-90-0	0,1
1041.	(*889*)	Isocyanate d'isobutyle	1873-29-6	0,1
1042.	(*913*)	Isocyanate d'isopropyle	1795-48-8	0,1
1043.	(*1001*)	Isocyanate de méthoxyméthyle	6427-21-0	0,1
1044.	(*1056*)	Isocyanate de méthyle	624-83-9	0,1
1045.	(*1277*)	Isocyanate de phényle	103-71-9	0,1
1046.	(*1369*)	Isocyanate de *n*-propyle	110-78-1	0,1
1047.	(*898*)	Isophorone	78-59-1	1
1048.	(*899*)	Isophoronediamine	2855-13-2	1
1049.	(*903*)	Isoprène	78-79-5	1
1050.	(*904*)	Isopropanol	67-63-0	1
1051.	(*905*)	Isopropanolamine	78-96-6	1
1052.	(*907*)	Isopropylamine	75-31-0	1
1053.	(*908*)	2-Isopropylaniline	643-28-7	1
1054.	(*909*)	Isopropylbenzène	98-82-8	1
1055.	(*916*)	*N*-Isopropyl-*N'*-phényl-*p*-phénylènediamine	101-72-4	1
1056.	(*918*)	Isoquinoléine	119-65-3	1
1057.	(*39*)	Isothiocyanate d'allyle	57-06-7	1
1058.	(*919*)	Jasmone	488-10-8	1
1059.	(*1727*)	Jaune de zinc	37300-23-5	1
1060.	(*275*)	Jaune diffus, C.I. 3	2832-40-8	1
1061.	(*1117*)	Jaune naturel 10	117-39-5	1
1062.	(*251*)	Lactate de *n*-butyle	138-22-7	1
1063.	(*1735*)	Lacticozirconate de sodium	10377-98-7	1
1064.	(*856*)	gamma-Lactone de l'acide hydroxydécanoïque	706-14-9	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1065.	(*860*)	gamma-Lactone de l'acide 4-hydroxyheptanoïque	105-21-5	1
1066.	(*864*)	Lactone de l'acide 5-hydroxyoctanoïque	104-50-7	1
1067.	(*926*)	Lauryldiméthylamine	112-18-5	1
1068.	(*948*)	*d*-Limonène	5989-27-5	1
1069.	(*949*)	*l*-Limonène	5989-54-8	1
1070.	(*520*)	Maléate de dibutylétain	78-04-6	1
1071.	(*966*)	Malonaldéhyde	542-78-9	1
1072.	(*1545*)	Malonate de thallium	2757-18-8	1
1073.	(*967*)	Malononitrile	109-77-3	1
1074.	(*968*)	Mandélonitrile	532-28-5	1
1075.	(*972*)	Manganèse, composés, n.s.a.***	—	1
1076.	(*973*)	Manganèse cyclopentadiényltricarbonyle	12079-65-1	1
1077.	(*974*)	Manganèse élémentaire	7439-96-5	1
1078.	(*1037*)	Manganèse méthylcyclopentadiényltricarbonyle	12108-13-3	1
1079.	(*989*)	Mercure, composés, n.s.a.***	—	1
1080.	(*990*)	Mercure élémentaire	7439-97-6	0,1
1081.	(*976*)	Mélamine	108-78-1	1
1082.	(*1338*)	Métabisulfite de potassium	16731-55-8	1
1083.	(*1447*)	Métabisulfite de sodium	7681-57-4	1
1084.	(*1448*)	Métasilicate de sodium	6834-92-0	1
1085.	(*97*)	Métavanadate d'ammonium	7803-55-6	1
1086.	(*1449*)	Métavanadate de sodium	13718-26-8	1
1087.	(*993*)	Méthacrylaldéhyde	78-85-3	1
1088.	(*40*)	Méthacrylate d'allyle	96-05-9	1
1089.	(*573*)	Méthacrylate de 2-(*N*,*N*-diéthylamino) éthyle	105-16-8	1
1090.	(*620*)	Méthacrylate de *N*,*N*-diméthylaminoéthyle	2867-47-2	1
1091.	(*995*)	Méthacrylate d'éthyle	97-63-2	0,1
1092.	(*737*)	Méthacrylate de 2-éthylhexyle	688-84-6	1
1093.	(*839*)	Méthacrylate d'hexyle	142-09-6	1
1094.	(*859*)	Méthacrylate de 2-hydroxyéthyle	868-77-9	1
1095.	(*928*)	Méthacrylate de lauryle	142-90-5	1
1096.	(*1059*)	Méthacrylate de méthyle	80-62-6	1
1097.	(*1526*)	Méthacrylate de tétrahydrofurfuryle	2455-24-5	1
1098.	(*1600*)	Méthacrylate de tributylétain	2155-70-6	1
1099.	(*1010*)	Méthacrylonitrile	126-98-7	1
1100.	(*996*)	gamma-Méthacryloxypropyltriméthoxysilane	2530-85-0	1
1101.	(*743*)	Méthanesulfonate d'éthyle	62-50-0	1
1102.	(*914*)	Méthanesulfonate d'isopropyle	926-06-7	0,1
1103.	(*1060*)	Méthanesulfonate de méthyle	66-27-3	1
1104.	(*997*)	Méthènamine	100-97-0	0,1
1105.	(*998*)	2-Méthoxy-1,4-benzènediamine	5307-02-8	1
1106.	(*999*)	2-Méthoxyéthanol	109-86-4	0,1
1107.	(*1002*)	*p*-Méthoxyphénol	150-76-5	1
1108.	(*1006*)	Méthylacétylène	74-99-7	1
1109.	(*1007*)	2-Méthylacrylamide	79-39-0	1
1110.	(*1008*)	*N*-Méthylacrylamide	1187-59-3	0,1
1111.	(*1011*)	Méthylal	109-87-5	1
1112.	(*1013*)	Méthylamine	74-89-5	0,1
1113.	(*1014*)	1-Méthylamino-4-éthanolaminoanthraquinone	2475-46-9	1
1114.	(*1015*)	Méthylamylcétone	110-43-0	1
1115.	(*1016*)	Méthyl-*n*-amylcétone	110-43-0	1
1116.	(*1017*)	*N*-Méthylaniline	100-61-8	1
1117.	(*1019*)	2-Méthyl-1,4-benzoquinone	553-97-9	1
1118.	(*1021*)	1-Méthyl-2-benzylhydrazine	10309-79-2	0,1
1119.	(*1022*)	*N*-Méthyl-bis (2-chloroéthyl)amine	51-75-2	1
1120.	(*1024*)	3-Méthyl-2-butanone	563-80-4	1
1121.	(*1025*)	*N*-Méthylbutylamine	110-68-9	1
1122.	(*1030*)	Méthylchlorosilane	993-00-0	1
1123.	(*1031*)	3-Méthylcholanthrène	56-49-5	0,1
1124.	(*1032*)	5-Méthylchrysène	3697-24-3	1
1125.	(*1034*)	Méthylcyclohexane	108-87-2	1
1126.	(*1035*)	Méthylcyclohexanol	25639-42-3	1
1127.	(*1036*)	2-Méthylcyclohexanone	583-60-8	1
1128.	(*1038*)	Méthyldichlorosilane	75-54-7	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1129.	(*1039*)	4,4′-Méthylènebis(2-chloroaniline)	101-14-4	0,1
1130.	(*1041*)	4,4′-Méthylènebis(*N,N*-diméthyl) benzènamine	101-61-1	0,1
1131.	(*1040*)	Méthylène bis (4-isocyanatocyclohexyle)	5124-30-1	0,1
1132.	(*1042*)	2,2′-Méthylènebis(4-méthyl-6-*tert*- butylphénol)	119-47-1	1
1133.	(*1045*)	Méthyléthylcétone	78-93-3	1
1134.	(*1047*)	2-Méthyl-5-éthylpyridine	104-90-5	1
1135.	(*1049*)	Méthylfurane	534-22-5	1
1136.	(*1051*)	5-Méthylhexan-2-one	110-12-3	1
1137.	(*1052*)	Méthylhydrazine	60-34-4	0,1
1138.	(*1054*)	Méthylisobutylcarbinol	108-11-2	1
1139.	(*1055*)	Méthylisobutylcétone	108-10-1	1
1140.	(*1057*)	Méthylisopropénylcétone	814-78-8	1
1141.	(*526*)	Méthylmaléate de dibutylétain	15546-11-9	1
1142.	(*1058*)	Méthylmercartan	74-93-1	1
1143.	(*1061*)	Méthylmorpholine	109-02-4	1
1144.	(*1062*)	Méthylnaphtalène	1321-94-4	1
1145.	(*1063*)	*N*-Méthyl-*N*′-nitro-*N*-nitrosoguanidine	70-25-7	0,1
1146.	(*1115*)	Méthylnitrosocarbonate de 1-naphtyle	7090-25-7	1
1147.	(*1064*)	3-Méthyl-3-octanol	5340-36-3	1
1148.	(*1066*)	2-Méthylpentane	107-83-5	1
1149.	(*1067*)	2-Méthyl-1-pentanol	105-30-6	1
1150.	(*1068*)	Méthylphényldichlorosilane	149-74-6	1
1151.	(*1069*)	3-Méthyl-1-phényl-2-pyrazolin-5-one	89-25-8	1
1152.	(*1074*)	Méthylpropylcétone	107-87-9	1
1153.	(*1078*)	alpha-Méthylstyrène	98-83-9	1
1154.	(*1079*)	Méthyltétrahydrofurane	96-47-9	1
1155.	(*1081*)	Méthyltrichlorosilane	75-79-6	1
1156.	(*1082*)	Méthyltriéthoxysilane	2031-67-6	1
1157.	(*1083*)	Méthyltriméthoxysilane	1185-55-3	1
1158.	(*1085*)	Méthylvinylcétone	78-94-4	1
1159.	(*1086*)	2-Méthyl-5-vinylpyridine	140-76-1	1
1160.	(*1088*)	Mica	12001-26-2	1
1161.	(*98*)	Molybdate d'ammonium	13106-76-8	1
1162.	(*303*)	Molybdate de calcium	7789-82-4	1
1163.	(*422*)	Molybdate de cobalt (II)	13762-14-6	1
1164.	(*809*)	Molybdate d'exaammonium	12027-67-7	1
1165.	(*1450*)	Molybdate de sodium	7631-95-0	1
1166.	(*1091*)	Molybdène, composés, n.s.a.***	—	1
1167.	(*1092*)	Molybdène élémentaire	7439-98-7	1
1168.	(*1095*)	Monochloroacétone	78-95-5	1
1169.	(*876*)	Monochlorure d'iode	7790-99-0	1
1170.	(*1096*)	Monoéthanolamine	141-43-5	1
1171.	(*1098*)	Mononitro-*m*-toluidine	—	1
1172.	(*1099*)	Mononitro-*o*-toluidine	—	1
1173.	(*1100*)	Mononitro-*p*-toluidine	—	1
1174.	(*312*)	Monoxyde de carbone	630-08-0	0,1
1175.	(*941*)	Monoxyde de plomb	1317-36-8	1
1176.	(*1451*)	Monoxyde de sodium	12401-86-4	1
1177.	(*1101*)	Morpholine	110-91-8	1
1178.	(*1102*)	Morpholineéthanol	622-40-2	1
1179.	(*1104*)	Myrcène	123-35-3	0,1
1180.	(*1693*)	Naphta léger	8032-32-4	1
1181.	(*1108*)	Naphtalène	91-20-3	1
1182.	(*435*)	Naphténate de cuivre	1338-02-9	1
1183.	(*942*)	Naphténate de plomb	61790-14-5	1
1184.	(*1109*)	alpha-Naphtol	90-15-3	1
1185.	(*1110*)	bêta-Naphtol	135-19-3	1
1186.	(*1112*)	alpha-Naphtylamine	134-32-7	1
1187.	(*1113*)	bêta-Naphtylamine	91-59-8	0,1
1188.	(*1116*)	2-(1-Naphthyl)thioacétamide	17518-47-7	1
1189.	(*1118*)	Néohexane	75-83-2	1
1190.	(*1123*)	Nickel carbonyle	13463-39-3	0,1
1191.	(*1144*)	Nickel, composés, hydrosolubles, n.s.a.***	—	1
1192.	(*1143*)	Nickel, composés insolubles dans l'eau, n.s.a.***	—	1
1193.	(*1126*)	Nickel élémentaire	7440-02-0	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1194.	(*1133*)	Nickelocène	1271-28-9	0,1
1195.	(*1145*)	Nicotine	54-11-5	1
1196.	(*49*)	Nitrate d'aluminium	13473-90-0	1
1197.	(*1416*)	Nitrate d'argent	7761-88-8	1
1198.	(*1412*)	Nitrate d'argent ammoniacal	23606-32-8	1
1199.	(*145*)	Nitrate de baryum	10022-31-8	1
1200.	(*290*)	Nitrate de cadmium	10325-94-7	1
1201.	(*423*)	Nitrate de cobalt (II)	10141-05-6	1
1202.	(*326*)	Nitrate de césium	7789-18-6	1
1203.	(*436*)	Nitrate de cuivre (II)	3251-23-8	1
1204.	(*566*)	Nitrate de dicychlohexylammonium	3882-06-2	1
1205.	(*792*)	Nitrate de gallium (III)	13494-90-1	1
1206.	(*874*)	Nitrate d'indium	13770-61-1	1
1207.	(*922*)	Nitrate de lanthane	10099-59-9	1
1208.	(*1132*)	Nitrate de nickel (II)	13138-45-9	0,1
1209.	(*943*)	Nitrate de plomb	10099-74-8	0,1
1210.	(*1370*)	Nitrate de *n*-propyle	627-13-4	1
1211.	(*1452*)	Nitrate de sodium	7631-99-4	1
1212.	(*1546*)	Nitrate de thallium(I)	10102-45-1	1
1213.	(*1669*)	Nitrate d'uranyle	10102-06-4	1
1214.	(*1704*)	Nitrate d'ytterbium	13768-67-7	1
1215.	(*988*)	Nitrate mercureux	10415-75-5	1
1216.	(*983*)	Nitrate mercurique	10045-94-0	1
1217.	(*1339*)	Nitrite de potassium	7758-09-0	0,1
1218.	(*1453*)	Nitrite de sodium	7632-00-0	1
1219.	(*1149*)	5-Nitroacénaphtène	602-87-9	1
1220.	(*1150*)	*m*-Nitroaniline	99-09-2	1
1221.	(*1151*)	*o*-Nitroaniline	88-74-4	1
1222.	(*1152*)	*p*-Nitroaniline	100-01-6	1
1223.	(*1153*)	5-Nitro-*o*-anisidine	99-59-2	0,1
1224.	(*1154*)	2-Nitroanisole	91-23-6	1
1225.	(*1155*)	3-Nitroanisole	555-03-3	1
1226.	(*1156*)	4-Nitroanisole	100-17-4	1
1227.	(*1157*)	Nitrobenzène	98-95-3	1
1228.	(*1162*)	*m*-Nitrobenzylidyne	98-46-4	1
1229.	(*1163*)	*o*-Nitrobenzylidyne	384-22-5	1
1230.	(*1164*)	*p*-Nitrobenzylidyne	402-54-0	1
1231.	(*1165*)	4-Nitrobiphényle	92-93-3	0,1
1232.	(*1166*)	*m*-Nitrobromobenzène	585-79-5	1
1233.	(*1167*)	*o*-Nitrobromobenzène	577-19-5	1
1234.	(*1168*)	*p*-Nitrobromobenzène	586-78-7	1
1235.	(*1169*)	*m*-Nitrochlorobenzène	121-73-3	1
1236.	(*1170*)	*o*-Nitrochlorobenzène	88-73-3	1
1237.	(*1171*)	*p*-Nitrochlorobenzène	100-00-5	1
1238.	(*1172*)	3-Nitro-4-chlorobenzylidyne	121-17-5	1
1239.	(*1173*)	*p*-Nitrodiphénylamine	836-30-6	1
1240.	(*1174*)	Nitroéthane	79-24-3	1
1241.	(*1179*)	1-Nitroguanidine	556-88-7	1
1242.	(*1181*)	Nitrométhane	75-52-5	1
1243.	(*1182*)	4-Nitrophénétole	100-29-8	1
1244.	(*1183*)	*m*-Nitrophénol	554-84-7	1
1245.	(*1184*)	*o*-Nitrophénol	88-75-5	1
1246.	(*1185*)	*p*-Nitrophénol	100-02-7	1
1247.	(*1186*)	1-Nitropropane	108-03-2	1
1248.	(*1187*)	2-Nitropropane	79-46-9	0,1
1249.	(*1188*)	4-Nitroquinoléine-1-oxyde	56-57-5	1
1250.	(*1189*)	*N*-Nitrosodibutylamine	924-16-3	0,1
1251.	(*1190*)	*N*-Nitrosodiéthanolamine	1116-54-7	0,1
1252.	(*1191*)	*N*-Nitrosodiéthylamine	55-18-5	0,1
1253.	(*1192*)	*N*-Nitrosodiméthylamine	62-75-9	0,1
1254.	(*1193*)	*N*-Nitrosodiphénylamine	86-30-6	0,1
1255.	(*1194*)	*p*-Nitrosodiphénylamine	156-10-5	1
1256.	(*1195*)	*N*-Nitrosodipropylamine	621-64-7	0,1
1257.	(*1196*)	*N*-Nitroso-*N*-éthylurée	759-73-9	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I		Colonne II
		Ingrédient		
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1258.	(*1197*)	*N*-Nitroso-*N*-méthylurée	684-93-5	0,1
1259.	(*1198*)	Nitrosométhyluréthane	615-53-2	1
1260.	(*1199*)	*N*-Nitrosométhylvinylamine	4549-40-0	0,1
1261.	(*1200*)	*N*-Nitrosomorpholine	59-89-2	0,1
1262.	(*1201*)	*N'*-Nitrosonornicotine	16543-55-8	0,1
1263.	(*1202*)	*N*-Nitrosopipéridine	100-75-4	0,1
1264.	(*1203*)	*N*-Nitrosopyrrolidine	930-55-2	0,1
1265.	(*1204*)	*N*-Nitrososarcosine	13256-22-9	0,1
1266.	(*1207*)	*m*-Nitrotoluène	99-08-1	1
1267.	(*1208*)	*o*-Nitrotoluène	88-72-2	1
1268.	(*1209*)	*p*-Nitrotoluène	99-99-0	1
1269.	(*1210*)	5-Nitro-*o*-toluidine	99-55-8	1
1270.	(*1212*)	Nitroxylène, tous les isomères	—	1
1271.	(*309*)	Noir de carbone	1333-86-4	1
1272.	(*278*)	Noir de cuve, C.I. 27	2379-81-9	1
1273.	(*671*)	Noir direct meta	1937-37-7	0,1
1274.	(*1213*)	Nonane	111-84-2	1
1275.	(*746*)	Nonanoate d'éthyle	123-29-5	1
1276.	(*1214*)	Nonylphénol	25154-52-3	1
1277.	(*1215*)	Nonyltrichlorosilane	5283-67-0	1
1278.	(*1216*)	Octachloronaphtalène	2234-13-1	1
1279.	(*1217*)	*n*-Octadécylamine	124-30-1	1
1280.	(*1218*)	Octadécyltrichlorosilane	112-04-9	1
1281.	(*1219*)	Octane	111-65-9	1
1282.	(*1221*)	3-Octanol	589-98-0	1
1283.	(*1222*)	gamma-*n*-Octyl-gamma-*n*-butyrolactone	2305-05- 7	1
1284.	(*1223*)	Octyltrichlorosilane	5283-66-9	1
1285.	(*253*)	Oléate de butyle	142-77-8	1
1286.	(*21*)	Orange acide 10	1936-15-8	1
1287.	(*273*)	Orange acide, C.I. 52	547-58-0	1
1288.	(*1090*)	Orange de molybdène	12656-85-8	0,1
1289.	(*747*)	Orthoformiate d'éthyle	122-51-0	1
1290.	(*1065*)	Orthoformiate de méthyle	149-73-5	1
1291.	(*1661*)	Orthovanadate de trisodium	13721-39-6	1
1292.	(*760*)	Oxalate d'ammonium et de fer (III)	14221-47-7	1
1293.	(*748*)	Oxalate d'éthyle	95-92-1	1
1294.	(*1229*)	Oxamide	471-46-5	1
1295.	(*1230*)	Oxybis (dibutyl(2,4,5-trichlorophénoxy)étain)	74007-80-0	1
1296.	(*1296*)	Oxybromure de phosphore	7789-59-5	1
1297.	(*1297*)	Oxychlorure de phosphore	10025-87-3	1
1298.	(*50*)	Oxyde d'aluminium	1344-28-1	1
1299.	(*185*)	Oxyde de béryllium	1304-56-9	0,1
1300.	(*202*)	Oxyde de bis (tributylétain)	56-35-9	1
1301.	(*203*)	Oxyde de bis (tris (2-méthyl-2-phénylpropyl)étain)	13356-08-6	1
1302.	(*291*)	Oxyde de cadmium	1306-19-0	0,1
1303.	(*304*)	Oxyde de calcium	1305-78-8	1
1304.	(*400*)	Oxyde de chrome (III)	1308-38-9	1
1305.	(*401*)	Oxyde de chrome (VI)	1333-82-0	0,1
1306.	(*424*)	Oxyde de cobalt (II)	1307-96-6	1
1307.	(*437*)	Oxyde de cuivre (I)	1317-39-1	1
1308.	(*527*)	Oxyde de dibutylétain	818-08-6	1
1309.	(*331*)	Oxyde de diphényle chloré	55720-99-5	1
1310.	(*725*)	Oxyde d'éthylène	75-21-8	0,1
1311.	(*879*)	Oxyde de fer, de manganèse et de zinc	12645-49-7	0,1
1312.	(*880*)	Oxyde de fer, de nickel et de zinc	12645-50-0	0,1
1313.	(*927*)	Oxyde de lauryldiméthylamine	1643-20-5	1
1314.	(*959*)	Oxyde de magnésium	1309-48-4	1
1315.	(*991*)	Oxyde de mésityle	141-79-7	1
1316.	(*1134*)	Oxyde de nickel (II)	1313-99-1	0,1
1317.	(*1135*)	Oxyde de nickel (III)	1314-06-3	1
1318.	(*1142*)	Oxyde de nickel et de titane	12035-39-1	0,1
1319.	(*1365*)	Oxyde de propylène	75-56-9	1
1320.	(*1474*)	Oxyde de styrène	96-09-3	1
1321.	(*1492*)	Oxyde de tantale	1314-61-0	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1322.	(*1547*)	Oxyde de thallium(III)	1314-32-5	1
1323.	(*1608*)	Oxyde de trichlorobutylène	3083-25-8	1
1324.	(*1609*)	Oxyde de trichlorodiphényle	57321-63-8	1
1325.	(*1659*)	Oxyde de tris (1-aziridinyl)phosphine	545-55-1	1
1326.	(*1717*)	Oxyde de zinc	1314-13-2	1
1327.	(*762*)	Oxyde ferrique	1309-37-1	1
1328.	(*984*)	Oxyde mercurique	21908-53-2	0,1
1329.	(*1211*)	Oxyde nitreux	10024-97-2	0,1
1330.	(*1147*)	Oxyde nitrique	10102-43-9	1
1331.	(*1676*)	Oxytrichlorure de vanadium	7727-18-6	1
1332.	(*1232*)	Ozone	10028-15-6	1
1333.	(*1235*)	Paraformaldéhyde	30525-89-4	1
1334.	(*1236*)	Paraldéhyde	123-63-7	0,1
1335.	(*1237*)	Pararosaniline, chlorhydrate de	569-61-9	1
1336.	(*1239*)	Pentaborane	19624-22-7	1
1337.	(*1298*)	Pentabromure de phosphore	7789-69-7	1
1338.	(*1240*)	Pentachloroéthane	76-01-7	1
1339.	(*1241*)	Pentachloronaphtalène	1321-64-8	1
1340.	(*1242*)	Pentachlorothiophénol	133-49-3	1
1341.	(*1299*)	Pentachlorure de phosphore	10026-13-8	1
1342.	(*1417*)	Pentafluoropropionate d'argent	509-09-1	1
1343.	(*124*)	Pentafluorure d'antimoine (V)	7783-70-2	1
1344.	(*213*)	Pentafluorure de brome	7789-30-2	1
1345.	(*334*)	Pentafluorure de chlore	13637-63-3	1
1346.	(*1300*)	Pentafluorure de phosphore	7647-19-0	1
1347.	(*1487*)	Pentafluorure de soufre	5714-22-7	1
1348.	(*1243*)	Pentane	109-66-0	1
1349.	(*1244*)	2,4-Pentanedione	123-54-6	1
1350.	(*1301*)	Pentasulfure de phosphore	1314-80-3	1
1351.	(*131*)	Pentoxyde d'arsenic	1303-28-2	1
1352.	(*1677*)	Pentoxyde de vanadium	1314-62-1	0,1
1353.	(*1246*)	*p-tert*-Pentylphénol	80-46-6	1
1354.	(*1247*)	Perchlorate, composés, n.s.a.***	—	1
1355.	(*1136*)	Perchlorate de nickel	13637-71-3	0,1
1356.	(*1249*)	Perchloroéthylene	127-18-4	1
1357.	(*1250*)	Perchlorométhylmercaptan	594-42-3	1
1358.	(*1252*)	Perilla, solution alcoolique	536-59-4	1
1359.	(*1341*)	Permanganate de potassium	7722-64-7	1
1360.	(*1718*)	Permanganate de zinc	23414-72-4	1
1361.	(*254*)	Peroxyacétate de *tert*-butyle	107-71-1	1
1362.	(*168*)	Peroxyde de benzoyle	94-36-0	1
1363.	(*468*)	Peroxyde de cyclohexanone	78-18-2	0,1
1364.	(*484*)	Peroxyde de diacétyle	110-22-5	1
1365.	(*849*)	Peroxyde d'hydrogène	7722-84-1	1
1366.	(*923*)	Peroxyde de lauryle	105-74-8	1
1367.	(*1046*)	Peroxyde de méthyléthylcétone	1338-23-4	1
1368.	(*915*)	Peroxydicarbonate d'isopropyle	105-64-6	1
1369.	(*1254*)	Persulfate, composés	—	0,1
1370.	(*1255*)	Pérylène	198-55-0	1
1371.	(*1257*)	Phénanthrène	85-01-8	1
1372.	(*1259*)	*o*-Phénétidine	94-70-2	1
1373.	(*1260*)	*p*-Phénétidine	156-43-4	1
1374.	(*1261*)	Phénol	108-95-2	1
1375.	(*1454*)	Phénolate de sodium	139-02-6	1
1376.	(*1263*)	Phénothiazine	92-84-2	1
1377.	(*1264*)	Phénylacétonitrile	140-29-4	1
1378.	(*1269*)	*N*-Phényldiéthanolamine	120-07-0	1
1379.	(*1271*)	*m*-Phénylènediamine	108-45-2	0,1
1380.	(*1272*)	*o*-Phénylènediamine	95-54-5	0,1
1381.	(*1273*)	*p*-Phénylènediamine	106-50-3	0,1
1382.	(*1274*)	*N*-Phényléthanolamine	122-98-5	1
1383.	(*1276*)	Phénylhydrazine	100-63-0	0,1
1384.	(*1278*)	Phénylmercaptan	108-98-5	1
1385.	(*1281*)	*N*-Phényl-bêta-naphtylamine	135-88-6	0,1
1386.	(*1282*)	*o*-Phénylphénol	90-43-7	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I		Colonne II
		Ingrédient		
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1387.	(*1283*)	Phénylphosphine	638-21-1	1
1388.	(*1287*)	1-Phényl-2-thiourée	103-85-5	1
1389.	(*1288*)	Phényltrichlorosilane	98-13-5	1
1390.	(*1289*)	Phosgène	75-44-5	1
1391.	(*425*)	Phosphate de cobalt (II)	13455-36-2	1
1392.	(*516*)	Phosphate de dibutyle	107-66-4	1
1393.	(*608*)	Phosphate de diisooctyle	27215-10-7	1
1394.	(*944*)	Phosphate de plomb	7446-27-7	0,1
1395.	(*1597*)	Phosphate de tributyle	126-73-8	1
1396.	(*1619*)	Phosphate de tricrésyle	1330-78-5	1
1397.	(*1620*)	Phosphate de tri-*ortho*-crésyle	78-30-8	1
1398.	(*1647*)	Phosphate de triméthyle	512-56-1	0,1
1399.	(*1653*)	Phosphate de triphényle	115-86-6	1
1400.	(*1660*)	Phosphate de tris(dibromopropyle)	126-72-7	0,1
1401.	(*1292*)	Phosphate sodique de bis (2-éthylhexyle)	141-65-1	1
1402.	(*1290*)	Phosphine	7803-51-2	1
1403.	(*517*)	Phosphite de dibutyle	1809-19-4	1
1404.	(*1648*)	Phosphite de triméthyle	121-45-9	1
1405.	(*1654*)	Phosphite de triphényle	101-02-0	1
1406.	(*1720*)	Phosphite de zinc	14332-59-3	1
1407.	(*1295*)	Phosphore	7723-14-0	1
1408.	(*632*)	Phosphorochloridothioate de *O,O*-diméthyle	2524-03-0	1
1409.	(*751*)	Phosphorodichloridate d'éthyle	1498-51-7	1
1410.	(*51*)	Phosphure d'aluminium	20859-73-8	1
1411.	(*960*)	Phosphure de magnésium	12057-74-8	1
1412.	(*1342*)	Phosphure de potassium	20770-41-6	1
1413.	(*1472*)	Phosphure de strontium	12504-13-1	1
1414.	(*1719*)	Phosphure de zinc	1314-84-7	1
1415.	(*241*)	Phtalate de butyle et de benzyle	85-68-7	1
1416.	(*518*)	Phtalate de dibutyle	84-74-2	1
1417.	(*594*)	Phtalate de diéthyle	84-66-2	0,1
1418.	(*590*)	Phtalate de di(2-éthylhexyle) (DEHP)	117-81-7	0,1
1419.	(*601*)	Phtalate de diheptyle	3648-21-3	0,1
1420.	(*633*)	Phtalate de diméthyle	131-11-3	1
1421.	(*197*)	Phtalate de di(2-méthoxyéthyle)	117-82-8	0,1
1422.	(*634*)	*p*-Phtalate de diméthyle	120-61-6	1
1423.	(*653*)	Phtalate de dioctyle	117-84-0	1
1424.	(*1307*)	*m*-Phtalodinitrile	626-17-5	1
1425.	(*1308*)	*o*-Picoline	109-06-8	1
1426.	(*1309*)	*p*-Picoline	108-89-4	1
1427.	(*1311*)	Pinacol	76-09-5	1
1428.	(*1312*)	alpha-Pinène	80-56-8	1
1429.	(*1313*)	bêta-Pinène	127-91-3	1
1430.	(*1314*)	Pipérazine	110-85-0	0,1
1431.	(*1315*)	Pipérazine, chlorhydrate	142-64-3	0,1
1432.	(*1318*)	Platine élémentaire	7440-06-4	1
1433.	(*1321*)	Platine, sels hydrosolubles, n.s.a.***	—	0,1
1434.	(*940*)	Plomb, composés minéraux, n.s.a.***	—	1
1435.	(*937*)	Plomb élémentaire	7439-92-1	0,1
1436.	(*1519*)	Plomb-tétraéthyle	78-00-2	1
1437.	(*1531*)	Plomb-tétraméthyle	75-74-1	1
1438.	(*1535*)	Plomb-tétrapropyle	3440-75-3	1
1439.	(*1322*)	Polybromobiphényles (PBB)	67774-32-7	0,1
1440.	(*1323*)	Polychlorobiphényles (PCB)	1336-36-3	0,1
1441.	(*99*)	Polysulfure d'ammonium	12259-92-6	1
1442.	(*1345*)	Propanesultone	1120-71-4	0,1
1443.	(*1346*)	1-Propanethiol	107-03-9	1
1444.	(*1347*)	Propanolamine	156-87-6	1
1445.	(*1349*)	bêta-Propiolactone	57-57-8	0,1
1446.	(*1350*)	Propionaldéhyde	123-38-6	1
1447.	(*261*)	Propionate de butyle	590-01-2	1
1448.	(*752*)	Propionate d'éthyle	105-37-3	1
1449.	(*1073*)	Propionate de méthyle	554-12-1	1
1450.	(*1371*)	Propionate de propyle	106-36-5	1
1451.	(*1722*)	Propionate de zinc	557-28-8	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1452.	(*1356*)	Propylamine	107-10-8	1
1453.	(*1360*)	Propylènediamine	78-90-0	1
1454.	(*1362*)	1,2-Propylèneglycol	57-55-6	1
1455.	(*1367*)	Propylènimine	75-55-8	0,1
1456.	(*1368*)	4-Propylgaïacol	2785-87-7	1
1457.	(*1372*)	Propyltrichlorosilane	141-57-1	1
1458.	(*1373*)	Pyrène	129-00-0	1
1459.	(*1374*)	Pyridine	110-86-1	1
1460.	(*1723*)	Pyrithione de zinc	13463-41-7	0,1
1461.	(*1375*)	Pyrogallol	87-66-1	1
1462.	(*1536*)	Pyrophosphate de tétrasodium	7722-88-5	1
1463.	(*1377*)	Quinaldine	91-63-4	1
1464.	(*1378*)	Quinoléine	91-22-5	1
1465.	(*1379*)	Résorcinol	108-46-3	1
1466.	(*1381*)	Rhodamine B	81-88-9	1
1467.	(*1382*)	Rhodanine	141-84-4	1
1468.	(*1383*)	Rhodium, composés, n.s.a.***	—	1
1469.	(*1384*)	Rhodium élémentaire	7440-16-6	1
1470.	(*1386*)	Ricin	9009-86-3	0,1
1471.	(*1455*)	Ricinoléate de sodium	5323-95-5	1
1472.	(*1390*)	Safrole	94-59-7	1
1473.	(*1391*)	Salicylaldéhyde	90-02-8	1
1474.	(*1075*)	Salicylate de méthyle	119-36-8	0,1
1475.	(*1601*)	Salicylate de tri-*n*-butylétain	4342-30-7	1
1476.	(*1343*)	Séléniate de potassium	7790-59-2	0,1
1477.	(*1456*)	Séléniate de sodium	13410-01-0	0,1
1478.	(*1395*)	Sélénium, composés, n.s.a.***	—	1
1479.	(*1398*)	Sélénium élémentaire	7782-49-2	0,1
1480.	(*850*)	Séléniure d'hydrogène	7783-07-5	0,1
1481.	(*1076*)	Séléniure de méthyle	593-79-3	1
1482.	(*1399*)	1,1'-Sélénobisbenzène	1132-39-4	1
1483.	(*1400*)	Sélénométhionine	1464-42-2	1
1484.	(*1401*)	Silane	7803-62-5	1
1485.	(*753*)	Silicate d'éthyle	78-10-4	1
1486.	(*1077*)	Silicate de méthyle	681-84-5	1
1487.	(*1404*)	Silice amorphe fondue	60676-86-0	1
1488.	(*1403*)	Silice amorphe sublimée	7631-86-9	1
1489.	(*1402*)	Silice, amorphe, terre à diatomées	68855-54-9	1
1490.	(*1405*)	Silice crystalline, cristobalite	14464-46-1	1
1491.	(*1406*)	Silice crystalline, quartz	14808-60-7	1
1492.	(*1407*)	Silice crystalline, tridymite	15468-32-3	1
1493.	(*1408*)	Silice crystalline, tripoli	—	1
1494.	(*1409*)	Silicofluorure, composés, n.s.a.***	—	1
1495.	(*146*)	Silicofluorure de baryum	17125-80-3	1
1496.	(*1724*)	Silicofluorure de zinc	16871-71-9	1
1497.	(*1460*)	Solasodine	126-17-0	0,1
1498.	(*1468*)	Solvant de Stoddard	8052-41-3	1
1499.	(*1461*)	Sorbaldéhyde	142-83-6	1
1500.	(*1478*)	Soudan G	85-86-9	1
1501.	(*1138*)	Sous-sulfure de nickel	12035-72-2	0,1
1502.	(*293*)	Stéarate de cadmium	2223-93-0	1
1503.	(*1327*)	Stéarate de polyéthylèneglycol	9004-99-3	1
1504.	(*1725*)	Stéarate de zinc	557-05-1	1
1505.	(*1420*)	Stéatite	—	1
1506.	(*1465*)	Stibamine	6543-62-0	1
1507.	(*1467*)	Stibine	7803-52-3	1
1508.	(*1473*)	Styrène	100-42-5	0,1
1509.	(*1475*)	Subtilisine BPN	1395-21-7	0,1
1510.	(*294*)	Succinate de cadmium	141-00-4	1
1511.	(*100*)	Sulfamate d'ammonium	7773-06-0	1
1512.	(*95*)	Sulfate acide d'ammonium	7783-20-2	1
1513.	(*1334*)	Sulfate acide de potassium	7646-93-7	1
1514.	(*186*)	Sulfate de béryllium	13510-49-1	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1515.	(*295*)	Sulfate de cadmium	10124-36-4	0,1
1516.	(*403*)	Sulfate de chrome (III)	10101-53-8	1
1517.	(*426*)	Sulfate de cobalt (II)	10124-43-3	1
1518.	(*327*)	Sulfate de césium	10294-54-9	1
1519.	(*438*)	Sulfate de cuivre (II)	7758-98-7	1
1520.	(*487*)	Sulfate de 2,4-diaminoanisole	39156-41-7	0,1
1521.	(*595*)	Sulfate de diéthyle	64-67-5	0,1
1522.	(*636*)	Sulfate de diméthyle	77-78-1	0,1
1523.	(*862*)	Sulfate d'hydroxylamine	10039-54-0	1
1524.	(*975*)	Sulfate de manganèse (II)	7785-87-7	1
1525.	(*1139*)	Sulfate de nickel (II)	7786-81-4	0,1
1526.	(*1121*)	Sulfate de nickel (II) ammoniacal	15699-18-0	0,1
1527.	(*1319*)	Sulfate de platine (II)	53231-79-1	0,1
1528.	(*945*)	Sulfate de plomb	7446-14-2	1
1529.	(*1549*)	Sulfate de thallium	10031-59-1	1
1530.	(*1550*)	Sulfate de thallium(II)	7446-18-6	1
1531.	(*1548*)	Sulfate de thallium(III)	16222-66-5	1
1532.	(*1573*)	Sulfate de titane	13825-74-6	1
1533.	(*1681*)	Sulfate de vanadyle	27774-13-6	1
1534.	(*1726*)	Sulfate de zinc	7733-02-0	1
1535.	(*1707*)	Sulfate de zinc et d'ammonium	7783-24-6	1
1536.	(*766*)	Sulfate ferreux	7720-78-7	1
1537.	(*985*)	Sulfate mercurique	7783-35-9	1
1538.	(*744*)	Sulfate sodique de 7-éthyl-2-méthyl-4-undécanol	139-88-8	1
1539.	(*1446*)	Sulfate sodique de lauryle	151-21-3	1
1540.	(*402*)	Sulfatochromate (III) de potassium	10141-00-1	1
1541.	(*1480*)	4,4'-Sulfonyldiphénol	80-09-1	1
1542.	(*654*)	Sulfosuccinate de dioctyle et de sodium	577-11-7	1
1543.	(*296*)	Sulfure de cadmium	1306-23-6	1
1544.	(*316*)	Sulfure de carbonyle	463-58-1	1
1545.	(*362*)	Sulfure de 2-chloroéthyle et d'éthyle	693-07-2	1
1546.	(*427*)	Sulfure de cobalt (II)	1317-42-6	1
1547.	(*439*)	Sulfure de cuivre (I)	22205-45-4	1
1548.	(*440*)	Sulfure de cuivre (II)	1317-40-4	1
1549.	(*596*)	Sulfure de diéthyle	352-93-2	1
1550.	(*851*)	Sulfure d'hydrogène	7783-06-4	1
1551.	(*1140*)	Sulfure de nickel (II)	11113-75-0	0,1
1552.	(*1286*)	Sulfure de phényle	139-66-2	1
1553.	(*1366*)	Sulfure de propylène	1072-43-1	1
1554.	(*1491*)	Tantale élémentaire	7440-25-7	1
1555.	(*101*)	Tellurate d'ammonium	13453-06-0	1
1556.	(*1494*)	Tellure, composés, n.s.a.***	—	1
1557.	(*1496*)	Tellure élémentaire	13494-80-9	1
1558.	(*1457*)	Tellurite de sodium	10102-20-2	1
1559.	(*198*)	Tellurure de bismuth	1304-82-1	1
1560.	(*1141*)	Tellurure de nickel	12142-88-0	0,1
1561.	(*1665*)	Térébenthine	8006-64-2	1
1562.	(*1501*)	Téréphtalonitrile	623-26-7	1
1563.	(*1502*)	*m*-Terphényle	92-06-8	1
1564.	(*1503*)	*o*-Terphényle	84-15-1	1
1565.	(*1504*)	*p*-Terphényle	92-94-4	1
1566.	(*1458*)	Tétraborate de sodium	1303-96-4	1
1567.	(*1506*)	Tétrabromoéthane	25167-20-8	1
1568.	(*668*)	Tétrabromopalladate de dipotassium	13826-93-2	1
1569.	(*313*)	Tétrabromure de carbone	558-13-4	1
1570.	(*1508*)	3,3',4,4'-Tétrachloroazobenzène	14047-09-7	1
1571.	(*1509*)	2,3,7,8-Tétrachlorodibenzo-*p*-dioxine (TCDD, «dioxine»)	1746-01-6	0,1
1572.	(*1510*)	1,1,1,2-Tétrachloro-2,2-difluoroéthane (FC 112a)	76-11-9	1
1573.	(*1511*)	1,1,2,2-Tétrachloro-1,2-difluoroéthane (FC 112)	76-12-0	1
1574.	(*1512*)	1,1,1,2-Tétrachloroéthane	630-20-6	1
1575.	(*1513*)	1,1,2,2-Tétrachloroéthane	79-34-5	1
1576.	(*1514*)	Tétrachloronaphtalène	1335-88-2	1
1577.	(*1344*)	Tétrachloroplatinate(II) de potassium	10025-99-7	0,1
1578.	(*1516*)	1,1,2,3-Tétrachloropropène	10436-39-2	1
1579.	(*314*)	Tétrachlorure de carbone	56-23-5	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1580.	(*878*)	Tétrachlorure d'iridium	10025-97-5	1
1581.	(*1320*)	Tétrachlorure de platine (IV)	13454-96-1	0,1
1582.	(*1410*)	Tétrachlorure de silicium	10026-04-7	1
1583.	(*1498*)	Tétrachlorure de tellure	10026-07-0	1
1584.	(*1574*)	Tétrachlorure de titane	7550-45-0	1
1585.	(*1678*)	Tétrachlorure de vanadium	7632-51-1	1
1586.	(*1736*)	Tétrachlorure de zirconium	10026-11-6	1
1587.	(*1518*)	Tétraéthylènepentamine	112-57-2	1
1588.	(*1521*)	Tétraéthylétain	597-64-8	1
1589.	(*1522*)	Tétrafluorohydrazine	10036-47-2	1
1590.	(*1411*)	Tétrafluorure de silicium	7783-61-1	1
1591.	(*1488*)	Tétrafluorure de soufre	7783-60-0	1
1592.	(*1523*)	1,2,3,6-Tétrahydrobenzaldéhyde	100-50-5	1
1593.	(*1524*)	Tétrahydrofurane	109-99-9	1
1594.	(*1527*)	Tétrahydronaphtalène	119-64-2	1
1595.	(*794*)	Tétrahydrure de germanium	7782-65-2	1
1596.	(*1530*)	*N,N,N',N'*-Tétraméthyl-1,3-butanediamine	97-84-7	1
1597.	(*1532*)	Tétraméthylsuccinonitrile	3333-52-6	1
1598.	(*1533*)	Tétraméthylurée	632-22-4	1
1599.	(*1226*)	Tétraminotétrachloro-osmium	—	1
1600.	(*1505*)	Tétramminodichloroplatine (II)	13933-32-9	0,1
1601.	(*1534*)	Tétranitrométhane	509-14-8	1
1602.	(*1176*)	Tétroxyde d'azote	10544-72-6	1
1603.	(*1227*)	Tétroxyde d'osmium	20816-12-0	0,1
1604.	(*1537*)	Tétryle	479-45-8	1
1605.	(*1551*)	Thallium, composés hydrosolubles, n.s.a.***	—	1
1606.	(*1542*)	Thallium élémentaire	7440-28-0	1
1607.	(*1552*)	Thioacétamide	62-55-5	0,1
1608.	(*1553*)	4,4'-Thiobis(6-*tert*-butyl-*m*-crésol)	96-69-5	1
1609.	(*986*)	Thiocyanate mercurique	592-85-8	1
1610.	(*886*)	Thiocyanoacétate d'isobornyle	115-31-1	1
1611.	(*1554*)	4,4'-Thiodianiline	139-65-1	1
1612.	(*1285*)	Thiodichlorure de phénylphosphoreux	3497-00-5	1
1613.	(*1555*)	4,4'-Thiodiphénol	2664-63-3	1
1614.	(*613*)	bêta-Thiodipropionate de dilauryle	123-28-4	1
1615.	(*1557*)	bêta,bêta'-Thiodipropionitrile	111-97-7	1
1616.	(*1558*)	Thioglycol	60-24-2	1
1617.	(*1563*)	Thiophosgène	463-71-8	1
1618.	(*800*)	Thiosulfate d'or et de sodium	10233-88-2	1
1619.	(*1565*)	Thiourée	62-56-6	0,1
1620.	(*1566*)	Thirame	137-26-8	1
1621.	(*1577*)	*o*-Tolidine	119-93-7	0,1
1622.	(*1578*)	Toluène	108-88-3	1
1623.	(*1582*)	Toluène-ar,ar'-diamine	25376-45-8	0,1
1624.	(*1579*)	Toluène-2,4-diamine	95-80-7	0,1
1625.	(*1580*)	Toluène-3,4-diamine	496-72-0	0,1
1626.	(*1581*)	Toluène-3,5-diamine	108-71-4	0,1
1627.	(*1583*)	Toluène diisocyanate	26471-62-5	0,1
1628.	(*1584*)	Toluène-2,4-diisocyanate	584-84-9	0,1
1629.	(*1585*)	Toluène-2,6-diisocyanate	91-08-7	0,1
1630.	(*1586*)	*o*-Toluènesulfonamide	88-19-7	1
1631.	(*1080*)	*p*-Toluènesulfonate de méthyle	80-48-8	1
1632.	(*1588*)	*m*-Toluidine	108-44-1	1
1633.	(*1589*)	*o*-Toluidine	95-53-4	0,1
1634.	(*1590*)	*p*-Toluidine	106-49-0	0,1
1635.	(*1592*)	Triallylamine	102-70-5	1
1636.	(*206*)	Tribromure de bore	10294-33-4	1
1637.	(*1302*)	Tribromure de phosphore	7789-60-8	1
1638.	(*953*)	Tri-*tert*-Butoxyhydrure d'aluminium et de lithium	17476-04-9	1
1639.	(*1595*)	Tributylamine	102-82-9	1
1640.	(*1602*)	Trichloroacétamide	594-65-0	1
1641.	(*1605*)	1,2,4-Trichlorobenzène	120-82-1	1
1642.	(*1606*)	1,3,5-Trichlorobenzène	108-70-3	1
1643.	(*1607*)	Trichlorobutène	51023-22-4	1
1644.	(*1610*)	1,1,1-Trichloroéthane	71-55-6	0,1

LISTE DE DIVULGATION DES INGRÉDIENTS (*suite*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS*	Concentration (%-poids/poids)
1645.	(*1611*)	1,1,2-Trichloroéthane	79-00-5	1
1646.	(*1612*)	Trichloroéthylène	79-01-6	1
1647.	(*1613*)	Trichlorofluorométhane (FC 11)	75-69-4	1
1648.	(*1615*)	Trichloronaphtalène	1321-65-9	1
1649.	(*1616*)	1,2,3-Trichloropropane	96-18-4	1
1650.	(*1617*)	Trichlorosilane	10025-78-2	1
1651.	(*1618*)	1,1,2-Trichloro-1,2,2-trifluoroéthane (FC 113)	76-13-1	1
1652.	(*125*)	Trichlorure d'antimoine (III)	10025-91-9	1
1653.	(*133*)	Trichlorure d'arsenic (III)	7784-34-1	1
1654.	(*207*)	Trichlorure de bore	10294-34-5	1
1655.	(*789*)	Trichlorure de gadolinium	10138-52-0	1
1656.	(*1094*)	Trichlorure de monobutylétain	1118-46-3	1
1657.	(*801*)	Trichlorure d'or	13453-07-1	1
1658.	(*1303*)	Trichlorure de phosphore	7719-12-2	1
1659.	(*1385*)	Trichlorure de rhodium	10049-07-7	1
1660.	(*1393*)	Trichlorure de samarium	10361-82-7	1
1661.	(*1575*)	Trichlorure de titane	7705-07-9	1
1662.	(*1679*)	Trichlorure de vanadium	7718-98-1	1
1663.	(*1621*)	Triéthanolamine	102-71-6	1
1664.	(*1622*)	Triéthylallylgermanium	1793-90-4	1
1665.	(*1623*)	Triéthylamine	121-44-8	1
1666.	(*1624*)	Triéthylènediamine	280-57-9	1
1667.	(*1625*)	Triéthylèneglycol	112-27-6	1
1668.	(*1628*)	Triéthylènemélamine	51-18-3	0,1
1669.	(*1629*)	Triéthylènetétramine	112-24-3	0,1
1670.	(*1632*)	Trifluorobromométhane	75-63-8	1
1671.	(*1633*)	2-(Trifluorométhyl)aniline	88-17-5	1
1672.	(*1634*)	3-(Trifluorométhyl)aniline	98-16-8	1
1673.	(*1177*)	Trifluorure d'azote	7783-54-2	1
1674.	(*208*)	Trifluorure de bore	7637-07-2	1
1675.	(*209*)	Trifluorure de bore, diéthyléthérate	109-63-7	1
1676.	(*210*)	Trifluorure de bore, dihydrate	13319-75-0	1
1677.	(*214*)	Trifluorure de brome	7787-71-5	1
1678.	(*335*)	Trifluorure de chlore	7790-91-2	1
1679.	(*1304*)	Trifluorure de phosphore	7783-55-3	1
1680.	(*1635*)	Triisopropanolamine	122-20-3	1
1681.	(*1637*)	Triméthylamine	75-50-3	1
1682.	(*1638*)	Triméthylbenzène	25551-13-7	1
1683.	(*1639*)	1,2,3-Triméthylbenzène	526-73-8	1
1684.	(*1640*)	1,2,4-Triméthylbenzène	95-63-6	0,1
1685.	(*1641*)	1,3,5-Triméthylbenzène	108-67-8	0,1
1686.	(*1643*)	3,3,5-Triméthylcyclohexanol	116-02-9	1
1687.	(*1644*)	Triméthylcyclohexylamine	34216-34-7	1
1688.	(*1645*)	Triméthylhexaméthylènediamine	25620-58-0	1
1689.	(*1649*)	Triméthylthiourée	2489-77-2	1
1690.	(*1651*)	2,4,6-Trinitrotoluène	118-96-7	1
1691.	(*126*)	Trioxyde d'antimoine	1309-64-4	1
1692.	(*134*)	Trioxyde d'arsenic	1327-53-3	0,1
1693.	(*1178*)	Trioxyde d'azote	10544-73-7	1
1694.	(*1093*)	Trioxyde de molybdène	1313-27-5	1
1695.	(*1305*)	Trioxyde de phosphore	1314-24-5	1
1696.	(*1489*)	Trioxyde de soufre	7446-11-9	1
1697.	(*1680*)	Trioxyde de vanadium	1314-34-7	0,1
1698.	(*1652*)	Triphénylamine	603-34-9	1
1699.	(*1658*)	Tripropylamine	102-69-2	1
1700.	(*135*)	Trisulfure d'arsenic	1303-33-9	1
1701.	(*1459*)	Tungstate de sodium	13472-45-2	1
1702.	(*1663*)	Tungstène, composés, n.s.a.***	—	1
1703.	(*1664*)	Tungstène élémentaire	7440-33-7	1
1704.	(*1666*)	Undécanol	112-42-5	1
1705.	(*1084*)	Undécylénate de méthyle	5760-50-9	1
1706.	(*1667*)	Uranium, composés, n.s.a.***	—	1
1707.	(*1668*)	Uranium élémentaire	7440-61-1	1
1708.	(*1670*)	Uréthane	51-79-6	0,1
1709.	(*1671*)	Valéraldéhyde	110-62-3	1

LISTE DE DIVULGATION DES INGRÉDIENTS (*fin*)

		Colonne I Ingrédient		Colonne II
Article		Dénomination chimique	Numéro d'enregistrement CAS	Concentration (%-poids/poids)
1710.	(*102*)	Vanadate d'ammonium	11115-67-6	1
1711.	(*1674*)	Vanadate de triisobutyle	19120-62-8	1
1712.	(*1675*)	Vanadium élémentaire	7440-62-2	1
1713.	(*1682*)	Vératraldéhyde	120-14-9	1
1714.	(*282*)	Vert de cuve, C.I. 2	25704-81-8	1
1715.	(*961*)	Vert de malachite	569-64-2	1
1716.	(*1690*)	*N*-Vinyl-2-pyrrolidone	88-12-0	1
1717.	(*1691*)	Vinyltoluène	25013-15-4	1
1718.	(*1692*)	Vinyltrichlorosilane	75-94-5	1
1719.	(*274*)	Violet alcalin, C.I. 1	548-62-9	0,1
1720.	(*1087*)	Violet de méthyle	1325-82-2	1
1721.	(*411*)	Volatiles du brai	65996-93-2	0,1
1722.	(*1694*)	*m*-Xylène	108-38-3	1
1723.	(*1695*)	*o*-Xylène	95-47-6	1
1724.	(*1696*)	*p*-Xylène	106-42-3	0,1
1725.	(*1697*)	*alpha,alpha'*-diamino-*m*-Xylène	1477-5 5-0	1
1726.	(*1699*)	Xylidine	1300-73-8	1
1727.	(*1700*)	2,4-Xylidine	95-68-1	1
1728.	(*1701*)	2,5-Xylidine	95-78-3	1
1729.	(*1698*)	Xylénol	1300-71-6	1
1730.	(*1103*)	Ypérite (gaz moutarde) [sulfure de di(2-chloroéthyle)]	505-60-2	0,1
1731.	(*1705*)	Yttrium, composés	—	1
1732.	(*1706*)	Yttrium élémentaire	7440-65-5	1
1733.	(*1728*)	Zirame	137-30-4	1
1734.	(*1729*)	Zircone	14940-68-2	1
1735.	(*1732*)	Zirconium, composés, n.s.a.***	—	1
1736.	(*1733*)	Zirconium élémentaire	7440-67-2	1

Note : * «CAS» Signifie *Chemical Abstracts Service Division* de l'*American Chemical Society*.

** Le numéro entre parenthèses qui apparaît à la suite du numéro d'article correspond au numéro d'article de l'ingrédient dans la version anglaise de la Liste.

*** «n.s.a.» Signifie non spécifié autrement.

CHAPTER 5

WORKER EDUCATION

CONTENTS

Page

5.1 INTRODUCTION 1

5.1.1 CHAPTER OBJECTIVES 1

5.1.2 EDUCATION, INSTRUCTION, TRAINING AND INFORMATION 2

5.2 RESPONSIBILITIES AND ROLES IN THE EDUCATION OF WORKERS 3

5.2.1 THE SUPPLIER 3

5.2.2 THE EMPLOYER 3

5.2.3 THE WORKER 5

5.3 SOURCES OF INFORMATION FOR WORKER EDUCATION 6

5.3.1 THE CONTROLLED PRODUCT IS RECEIVED FROM A SUPPLIER 6

5.3.2 THE CONTROLLED PRODUCT IS PRODUCED BY THE EMPLOYER 7

5.4 DETERMINATION OF WHO MUST BE EDUCATED 8

5.5 THE PROGRAM OF INSTRUCTION 9

5.5.1 PROGRAM OBJECTIVE 9

5.5.2 PROGRAM CONTENT 10

1. Instruction on Labels and Data Sheets 10

2. Training in Work Procedures 12

3. Generic Instruction 13

5.5.3 CRITERIA OF A SUCCESSFUL PROGRAM 15

5.5.4 DEVELOPMENT, IMPLEMENTATION AND REVIEW OF THE PROGRAM 16

1. Development and Implementation 16

2. Review 16

5.1 INTRODUCTION

5.1.1 CHAPTER OBJECTIVES

WHMIS is, at heart, a system of information delivery to workers with three basic elements: labels, material safety data sheets, and worker education.

Legal requirements for worker education are adopted through the various OS&H regulatory agencies, based on the WHMIS Model OSH Regulations.

The objectives of this Chapter are:

Objectives	Location in Chapter
To discuss the meaning of the terms education, instruction, training and provision of information.	5.1.2
To outline the roles and responsibilities of the employer, supplier and worker in the education of workers.	5.2
To discuss the types of information sources of which the employer "ought to be aware" when preparing to educate workers.	5.3
To discuss the means for determining which workers must be educated.	5.4
To discuss six aspects of programs of instruction which employers must provide to workers:	5.5
• Program objective	5.5.1
• Instruction on labels and data sheets	5.5.2
• Training in work procedures	5.5.2
• Generic instruction	5.5.2
• Criteria of a successful program	5.5.3
• Development, implementation and review of the program	5.5.4

5.1.2 EDUCATION, INSTRUCTION, TRAINING AND INFORMATION

Worker education on controlled products must be provided as an essential part of the WHMIS information delivery system. **Education** of workers includes all those activities which provide knowledge and skills to workers so that they may work safely with, or in proximity to, controlled products in the workplace. Three forms of education referenced in WHMIS legislation are instruction, training and provision of information.

Instruction is the methodical teaching of information. **Training** is one type of instruction in which workers are taught specific work procedures. WHMIS requires that a program of instruction be established, which provides not only procedures training but also knowledge about requirements for labels and data sheets and information on controlled products of significance to worker health and safety.

WHMIS also places a general responsibility with the employer to provide workers with all hazard **information** received from suppliers and information of which the employer is or ought to be aware. In good part, the responsibility will be discharged through programs of instruction. In some cases; for example, where information updates are received on a product, it may be possible to provide information to workers by less formal means such as announcements at staff or tool-box meetings, information circulars and the like.

5.2 RESPONSIBILITIES AND ROLES IN THE EDUCATION OF WORKERS

5.2.1 THE SUPPLIER

The supplier has no direct responsibilities for the education of workers. The supplier does, however, play a role in the education process by meeting his or her responsibilities to provide up-to-date supplier labels and material safety data sheets to the employer.

5.2.2 THE EMPLOYER

The employer has the basic responsibility for educating workers. Specifically, the employer must:

1. on each controlled product supplied to the workplace, provide all hazard information received from the supplier and any additional information of which the employer is or ought to be aware concerning the use, storage and handling of the controlled product;
2. on each controlled product produced in the workplace, provide all hazard information of which the employer is or ought to be aware concerning the use, storage and handling of the controlled product;
3. develop and implement a program of worker instruction on controlled products which includes:
    - education in the content required on, and the purpose and significance of information disclosed on, labels and material safety data sheets;
    - education in the use of means of identification such as colour, number or letter codes, or other means when used with transfer or reaction systems and wastes;
    - training in procedures for the safe storage, handling, use and disposal of controlled products;
    - training in procedures to be followed in case of an emergency involving a controlled product; and
    - training in procedures to be followed when fugitive emissions are present;
4. consult with the joint health and safety committee (if any) or health and safety representative (if any) during the development, implementation and review of the program of instruction;
5. ensure, as far as reasonably practicable, that the program of instruction results in a worker being able to **apply** the information as needed to protect health and safety;

6. review the program of instruction at least annually, but more frequently if required by a change in work conditions or available hazard information;

7. provide training (where the employer makes data sheets available in the workplace on a computer terminal) in accessing computer-stored data sheets to an employee at the workplace and to members of the joint health and safety committee, if any, or health and safety representative, if any.

5.2.3 THE WORKER

The worker is not responsible for provision of education, but has several roles in the education process; namely, to:

1. receive and learn information on controlled products which the employer is required to provide;
2. inform the employer in any circumstance where the worker does not have adequate information on a controlled product to ensure worker health and safety;
3. work with the employer in the development, implementation and review of programs of instruction on controlled products when acting as a health and safety representative or if a member of the joint health and safety committee.

5.3 SOURCES OF INFORMATION FOR WORKER EDUCATION

Information sources on a controlled product which must be used by an employer when establishing a worker education program will depend, in part, on whether the product is received from a supplier or is produced in the workplace.

5.3.1 THE CONTROLLED PRODUCT IS RECEIVED FROM A SUPPLIER

In this case, the employer must ensure that employees who work with the product or in proximity to it are informed about:

- all hazard information received from the supplier concerning the product; and
- any information of which the employer is aware or ought to be aware concerning its storage, handling and use.

Hazard information from the supplier will be provided on the label and data sheet and, in some cases, in the form of a letter; for example, in response to inquiries from the employer or as a circularized statement warning of new hazard information to previous customers who may not have received a revised data sheet.

The employer needs to be aware of additional information on the product, where available. Sources which are considered appropriate and which may be consulted are:

- publications and computerized information available from the Canadian Centre for Occupational Safety and Health;
- publications available from industry or trade associations of which the employer is a member and from labour organization(s) representing workers at the workplace;
- publications of the regulatory agency with jurisdiction at the workplace.

It may not be necessary for the employer to consult every reference on this list; for example, if a supplier has already included information from a reference on the supplier MSDS. Likewise, the employer is not limited to the references on the list.

Chapter 7, "Resources", provides information on how to obtain many of these and other reference materials.

5.3.2 THE CONTROLLED PRODUCT IS PRODUCED BY THE EMPLOYER

In this case, the employer must ensure that employees who work with the product or in proximity to it are informed about all hazard information of which the employer is aware or ought to be aware concerning:

- the controlled product; and
- its storage, handling and use.

In brief, this means that the employer must inform workers about all classification information which brings the product into the WHMIS system and provide any additional information related to the product as discussed in 5.3.1.

Chapter 7, "Resources", includes a section of information on all reference documents specified in the *Controlled Products Regulations* for the purposes of classification.

5.4 DETERMINATION OF WHO MUST BE EDUCATED

Information and instruction must be provided to all workers who **work with** or **in proximity to** a controlled product.

A worker who works with a controlled product is any worker who stores, handles, uses or disposes of a controlled product or who immediately supervises another worker performing these duties.

"In proximity" is the area in which worker health and safety could be at risk during:

- the storage, handling, use or disposal of the product;
- maintenance operations; or
- emergencies such as accidental release or spill.

The physical area of risk depends on factors such as the quantity of the product, its form (gas, dust, liquid, solid, etc.), its extent of enclosure during use, scheduling of work activity and persistence of the product after its release.

Examples

1. Bulk quantities of chlorine are piped above ground from the receiving point at a pulp and paper mill to a location on site for use as a bleaching agent. Education about the hazards of chlorine will be required for all workers at the plant, at minimum, for the purposes of emergency evacuation.

2. A container of benzene is received at a hospital for transfer to and use in a laboratory. Instruction on the product will be required for the shipper/receiver, the worker who takes the container to the laboratory, lab personnel who handle, store or use the product, workers responsible in event of an emergency with the product and appropriate supervisors.

3. Boxes of welding rods are received at an auto manufacturing plant that employs six hundred workers for use by five welders in an assembly area. No workers other than the welders are likely to be exposed to welding fumes. Instruction will be required only for the five welders and appropriate supervisors (and for first aid personnel if exposure could produce acute ill health effects).

4. In a retail store, information/instruction must be provided to those workers who routinely handle large quantities of controlled and consumer products, and who may be exposed to harm as the result of a spill or other accident (e.g. warehouse staff).

5.5 THE PROGRAM OF INSTRUCTION

An organized program of instruction must be provided to workers at risk of exposure to controlled products. The program must achieve a basic objective, provide specified areas of content, be established in cooperation with safety and health committees or representatives when required, and be reviewed and upgraded regularly.

5.5.1 PROGRAM OBJECTIVE

The basic objective must be to ensure, as far as reasonably practicable, that workers receiving instruction are able to **apply** the information to protect worker health and safety. This objective has several implications:

- While all persons who work in proximity to a controlled product are likely to receive the same basic instruction on the product, the content may vary somewhat from worker to worker depending on the work they do. For example, a warehouse worker may need detailed information on storage and handling; a first aid attendant, information on toxicological properties and emergency measures. Office workers at a pulp mill will not need procedures training in the handling, use and storage of chlorine but will need training in emergency procedures in the event of a major gas release.

- Instruction must be integrated into the overall hazard prevention program in the workplace. Procedures training must take into account not only the information available from the label and data sheet, but also the particular circumstances of the workplace. It is not enough to know that the data sheet suggests a particular type of respirator for protection against a product. The worker must know where to obtain it, locations in the plant where its use is mandatory, how to test for fit, and, where necessary, how to maintain and store it.

- The proof of a successful program is the ability of workers to demonstrate safe procedures with controlled products and the knowledge of why those procedures are required.

5.5.2 PROGRAM CONTENT

Employers must provide instruction on each controlled product applied to or produced in the workplace. Instruction will be of two kinds:

- instruction about labels, data sheets and identifiers; and
- training in work procedures.

Instruction on labels, data sheets and identifiers will include both an explanation of the content WHMIS requires on these information sources as well as an explanation of the purpose and significance of the information on the documents concerning the controlled product in question. Procedures training will be based not only on the content of the label and data sheet but also on the circumstances in the workplace which affect the likelihood of exposure to the product and the corrective measures which must be taken.

1. Instruction on Labels and Data Sheets

Workers must be instructed in the **content required** on the supplier label, workplace label and the material safety data sheet, as well as the **purpose** and **significance** of the information contained on these information sources for each controlled product. In addition, workers must be instructed in the **meaning of modes of identification** (such as colour coding, numbers, abbreviations, etc.) where used so that workers are able to identify the product to which the mode applies and know how to obtain additional information on the product from available data sheets or labels.

a) Instruction on Required Content

Workers must be instructed in the elements of information required on the different types of supplier labels found in the workplace, elements of workplace labels, and the nine categories and associated information elements of the material safety data sheet.

For example, for the standard supplier label, workers must be told that the label has a distinctive hash mark border and contains seven basic elements of information (material identifier, supplier identifier, hazard symbols, risk phrases, precautionary statements, first aid measures and a statement advising that a material safety data sheet is available). If other types of supplier labels are found in the workplace; for example, for laboratory supply house chemicals or laboratory samples, workers will need to know the different types of information which must appear in each case.

b) Instruction in the Purpose of Information

Purpose refers to the reason why information is present. For example, workers must be instructed in:

- the purpose of the label as an alert and the data sheet as a supporting technical document;
- the purpose of the various elements on the label and data sheet; for example, the role of the hazard symbol as a means of quickly communicating which WHMIS hazard Class(es) and Division(s) the product belongs to; or the fact that the odour threshold of an organic solvent is provided, along with the exposure limit, to help determine the warning properties of the product.

c) Instruction in the Significance of Information

Significance refers to the question of how the employer and worker must respond to the information provided for a specific product and what they must do to ensure worker health and safety. For example:

- The significance of the corrosive material symbol on the supplier label is to alert the employer and worker to the need to protect against corrosive effects, particularly for the skin and eyes and, if airborne, the lungs. The employer and worker must examine the MSDS with particular attention to information related to corrosive effects. Appropriate control measure must be implemented.
- The significance of an odour threshold of 500 ppm and an exposure limit of 100 ppm for a product as reported on a data sheet is that the substance has poor warning properties. In other words, a worker would be unable to recognize the presence of a product from its smell or irritant qualities until it reached a concentration in air well above the level established for protection against adverse health effects. Warning properties will influence which control measures are used for protection. Air filtering respirators; for example, are not meant for protection against substances with poor warning properties.
- The significance of a skull and crossbones symbol on a supplier label is that the product is poisonous, considered either "very toxic" or "toxic" and is capable of causing immediate and serious toxic effects and possibly other toxic effects such as adverse chronic effects. The employer and worker must ensure that workers are instructed in the type(s) of toxic effect(s) and the measures to protect against exposure.

NOTE: If a product is included in WHMIS in Class D because it meets criteria for immediate and serious toxic effects (Division 1) as well as other effects (Division 2), the supplier must provide the skull and crossbones symbol but has the option of including the stylized "T" symbol. The stylized "T" is required when a product meets Division 2 criteria alone. As a result, an employer can never assume that the sole presence of the skull and crossbones symbol means the product is in WHMIS only because of acute effects. This point must be covered in worker education.

- If an employer uses a hazard symbol system on workplace labels other than WHMIS, the employer must provide instruction to workers of the significance of that system including the meaning of each symbol, the criteria used to assign symbols to products and the differences between such workplace symbols and WHMIS hazard symbols on supplier labels.

  For example, the NFPA symbol system relies on a set of number and colour codes. Workers must know the meaning of the codes including the criteria used for assigning a colour/number combination to a product. Workers must know that the NFPA system has limitations and is intended to apply to acute effects resulting from short-term exposure to products in emergency situations. Any use of such a symbol system must not result in workers being aware of less hazard information on a product than that provided by the WHMIS supplier label and material safety data sheet.

2. Training in Work Procedures

WHMIS requires that four areas of procedures training be provided, where applicable, to workers:

- training in procedures for the safe storage, handling, use and disposal of a product;
- training in procedures for the safe use, storage, handling and disposal of a controlled product contained or transferred in:

  a) a pipe;

  b) a piping system including valves;

  c) a process vessel;

  d) a reaction vessel; or

e) a tank car, tank truck, ore car, conveyor belt or similar conveyance;

- training in procedures to be followed in case of an emergency involving a controlled product; and
- training in procedures to be followed when fugitive emissions are present. A fugitive emission is a gas, liquid, solid, vapour, fume, mist, fog or dust that escapes from process equipment, emission control equipment or from a product. Examples include: gas discharges from pressure relief valves, liquid discharge from a double block and bleed valve, emissions of acid gases from a malfunctioning stack scrubber, and leakage from storage containers.

Procedures training must be based both on information from labels and data sheets and the specific circumstances of the worksite. The type of training provided to workers will depend on the nature of their work. For example, maintenance staff in an ammonia refrigeration plant will require procedures training in all four types of procedures; whereas office workers on site will likely need training only in emergency procedures in the event of a major gas release.

3. Generic Instruction

Generic instruction refers to the instruction of workers in WHMIS hazard information without reference to specific products or worksites; for example, when workers are educated about the common hazards of a group of oil-based paints without reference to the specific characteristics and identity of each paint.

Generic instruction is acceptable in the following cases:

a) instruction in the types of content required on supplier labels, workplace labels and material safety data sheets;

b) instruction in how WHMIS works;

c) instruction in the hazards of a group of products which have similar properties and for which it is acceptable to use a generic material safety data sheet, provided there is instruction in hazards peculiar to any one product in the group;

d) instruction in work procedures for a group of products if the procedures are basically the same for all the products in the group;

e) instruction in work procedures that apply to a variety of worksites if the work procedures are basically the same at each site; and

f) preliminary stages of instruction in a multi-stage instruction program. For example, a construction industry education program might involve initial generic instruction of workers in trade schools or through programs provided by construction industry health and safety organizations, followed by on-site instruction in specific product hazards and procedures through extended tool-box meetings and the like.

5.5.3 CRITERIA OF A SUCCESSFUL PROGRAM

The employer is expected, so far as is reasonably practicable, to take steps which ensure that the worker has understood the instruction material, and is able to put into practice, on the job, what he or she has learned. It is up to each employer to devise means to make certain that a worker has been properly trained. For example, the employer may ask the worker to take some form of written or oral test, or to participate in a practical demonstration.

The phrase "so far as is reasonably practicable" applies to situations where the employer may have difficulty in determining what workers have learned by oral or written means because of language or literacy problems. However, in such cases, employers and supervisors are expected to be able to determine the results of procedures training on the basis of actions of the employees.

Outcomes of a successful program include the abilities to:

- identify and describe the information categories on supplier labels, workplace labels and data sheets;
- identify and describe hazard information on a controlled product which is significant for worker health and safety;
- identify the controlled product to which a mode of identification other than a label applies;
- describe and follow procedures for the safe use, storage, handling and disposal of a controlled product and procedures in case of an emergency involving the product;
- describe and follow procedures which are required where fugitive emissions are present; and
- operate a computer terminal so as to be able to access material safety data sheets for controlled products at the workplace, in the situation when data sheets are made available at the workplace by computer and the worker has been selected for instruction in accessing data sheets where required by regulation.

5.5.4 DEVELOPMENT, IMPLEMENTATION AND REVIEW OF THE PROGRAM

1. Development and Implementation

The employer must ensure that the program of worker education is developed and implemented:

- for that employer's place of employment and related to the hazard prevention and control program at that place of employment; and
- in consultation with the joint health and safety committee, if any, or the health and safety representative, if any.

The program must be based not only on information provided by labels and the data sheet but also on the specific hazards posed by controlled products in the workplace and the means for their control. For example, a supplier who sells paints containing an aliphatic isocyanate, a potent sensitizing agent, is aware that the product may be used in a variety of ways, from spot touch-up to large-scale spray applications. Control measures, which correspondingly range from the use of hand protection and cartridge respirators to full body protection, airline respirators, general ventilation and isolation procedures, can be described on the data sheet. However, the choice of control measures and, with it, the type of instruction program will depend on workplace design and the use of the product.

Consultation with workers through the joint health and safety committee or representative will help ensure that the education program addresses actual difficulties of use of the product in the workplace and that the program communicates effectively with the people who will be taught.

2. Review

The employer must review the program of instruction at least once a year, or more often if:

- conditions at the workplace change; or
- new information on a controlled product becomes available.

The review must take place in consultation with the joint health and safety committee, if any, or worker health and safety representative, if any. There are a variety of means of demonstrating that reviews have been conducted as required by law; for example, through the minutes of the health and safety committee.

The requirement for review does not necessarily mean that re-instruction is necessary but is meant to identify whether updating of the program and, consequently, re-instruction of workers is required.

Examples of circumstances in which changes in product information or workplace conditions should not require the formal re-instruction of workers are:

- An updated material safety data sheet received at workplace provides new hazard information on the product. Management and the health and safety committee conclude that existing control procedures provide adequate protection against the newly identified hazard. After a review of the education program, it is decided that the new information can be adequately communicated by posting a copy of the revised data sheet on the staff notice board and making announcements at tool-box meetings.

- A well-managed education program for concrete workers provides hazard education and procedures training not only on cement but also on various additives and form release agents. At a large construction project, different types of form release agents will be used in situations that range from spraying of non-erected forms in open air to application on vertical forms in enclosed spaces. After a review of the education program, the joint health and safety committee advises management that supervisors and workers have received enough hazard education on form oils to know when to switch from the use of disposable dust/mist respirators to cartridge respirators that provide protection against mists and vapours. Their recommendation is that management remind supervisors of the need to consider viscosity of form oil and the location of application when determining the minimum form of protection required.

CHAPTER 6

CONFIDENTIAL BUSINESS INFORMATION

CONTENTS

Page

6.1 CHAPTER OBJECTIVES 1

6.2 INTRODUCTION 3

- 6.2.1 BALANCE BETWEEN RIGHT-TO-KNOW AND CONFIDENTIAL BUSINESS INFORMATION (CBI) 3
- 6.2.2 REVIEW OF LEGISLATION GOVERNING CONFIDENTIAL BUSINESS INFORMATION 3

6.3 CRITERIA OF CONFIDENTIAL BUSINESS INFORMATION 5

6.4 EFFECT OF CBI PROVISIONS ON INFORMATION AVAILABLE THROUGH WHMIS 6

- 6.4.1 INFORMATION WHICH MAY BE THE SUBJECT OF A CLAIM FOR EXEMPTION 6
- 6.4.2 LENGTH OF EXEMPTION PERIOD 6
- 6.4.3 CHANGES TO DATA SHEETS AND LABELS REQUIRED WITH A CLAIM FOR EXEMPTION 7
- 6.4.4 CIRCUMSTANCES IN WHICH EXEMPTED INFORMATION IS MADE AVAILABLE 8

6.5 STRUCTURE AND OPERATION OF THE HAZARDOUS MATERIALS INFORMATION REVIEW COMMISSION 10

- 6.5.1 OVERVIEW OF THE COMMISSION 10
  1. Council of Governors 10
  2. Administration 10
  3. Overview of the Claims Process 12
- 6.5.2 THE SCREENING DIVISION 13
  1. Functions of the Division 13
  2. The Claim Screening Process 15
- 6.5.3 THE APPEALS DIVISION 16
  1. Functions of the Division 16
  2. The Appeals Process 17

Page

6.6 HOW TO FILE A CLAIM OR APPEAL A DECISION 20

- 6.6.1 FILING A CLAIM 20
- 6.6.2 APPEALING A DECISION ON A CLAIM 21
- 6.6.3 FILING FEES 22

FIGURES

1 Organizational Structure of HMIRC 11

2 Claim Screening Process 14

3 Appeal Process for Claims 18

6.1 CHAPTER OBJECTIVES

Objectives	Location in Chapter
1. To discuss the issue of balance between worker right-to-know and withholding confidential business information (CBI).	6.2.1
2. To review the legislation which applies to the issue of confidential business information.	6.2.2
3. To describe the criteria for determining what constitutes confidential business information.	6.3
4. To describe the impact of CBI provisions on the availability of information in the WHMIS information delivery system; in particular, the:	
• types of information which may be withheld;	6.4.1
• length of the withholding period	6.4.2
• changes to content on labels and data sheets; and the	6.4.3
• circumstances in which withheld information must be made available.	6.4.4
5. To describe the structure of the Hazardous Materials Information Review Commission (HMIRC), with respect to the Commission and the screening and appeals divisions.	6.5
6. To review the operation of HMIRC with respect to filing a claim, appealing a decision on a claim, and fees.	6.6

6.2 INTRODUCTION

6.2.1 BALANCE BETWEEN RIGHT-TO-KNOW AND CONFIDENTIAL BUSINESS INFORMATION (CBI)

WHMIS is, at heart, a system of delivery of hazard information and protective measures on controlled products to workers. There may be circumstances, however, where release of information on the identity of a product or its ingredients or the identity of a supplier of a product may result in financial loss to the supplier or employer relative to competitors. Such information is termed confidential business information, (or trade secret, proprietary information, etc.) and is generally understood to be technical information on a product or its manufacturing process that has economic value or advantage and is known only to the producer or supplier.

Balancing the worker's right-to-know with the need to protect genuine confidential business information was a basic consideration during the development of WHMIS.

WHMIS provides a mechanism that permits suppliers or employers to withhold genuine confidential information in specified circumstances. A Hazardous Materials Information Review Commission has been established to review information both for and against claims for exemption. The mechanism for dispute resolution includes the use of regional Appeal Boards with representation from both business and labour, and in certain circumstances appeal to the federal courts.

Because the purpose of WHMIS is to protect the health and safety of workers, legislation requires disclosure of confidential business information by suppliers or employers who have filed claims for CBI where disclosure is necessary to assist medical professionals with medical diagnoses or treatment in emergencies, and if ordered by an Appeal Board for the purpose of protecting health and safety in a workplace.

6.2.2 REVIEW OF LEGISLATION GOVERNING CONFIDENTIAL BUSINESS INFORMATION

Four pieces of legislation govern the circumstances in which exemptions are permitted, and the effect on the delivery of hazard information in WHMIS.

- The **Hazardous Materials Information Review Act** (HMIR Act) prescribes the types of information which may be subject to disclosure exemptions and defines the structure and function of the Hazardous Materials Information Review Commission. Functions of the Commission include assessment and ruling on claims for exemption from disclosure, processing of appeals to rulings including the convening of Appeal Boards, and provision of information in confidence to specified parties.

- The ***Hazardous Materials Information Review Regulations*** describe the criteria which must be considered when judging whether or not a claim of confidential business information is valid.
- The ***Controlled Products Regulations*** prescribe, for the supplier, the adjustments which must be made to labels and data sheets in the event of filing a claim and its acceptance, and circumstances in which confidential business information must be made available.
- The **Model OSH Regulations, where enacted by provincial safety and health regulatory agencies**, provide details, for the employer, of CBI provisions equivalent to those established for the supplier under the *Controlled Products Regulations*.

6.3 CRITERIA OF CONFIDENTIAL BUSINESS INFORMATION

Four criteria must be considered when judging whether or not a claim of confidential business information is valid.

1. Information Must be Known Only to Designated Persons. The information on the product must be known only to:

   - certain designated persons who have been employed by or are in a business relationship with the claimant;

   - government officials to whom the information has been disclosed in compliance with regulatory reporting requirements; and

   - medical professionals to whom the information has been disclosed for the purpose of medical diagnosis or treatment.

2. The Claimant Must Have Taken Reasonable Care to Maintain Confidentiality of Information. This includes alerting employees and business associates who are aware of the information that the information must be considered confidential.

3. The Information Must Have Economic Value to the Claimant or Competitors because it is not generally known, and because disclosure would result in material financial loss to the claimant or material financial gain to competitors.

4. The Information Must Represent a Significant Development Cost to the Firm. The money expended and business resources used to develop the information must be substantial and consistent with the cost and resources involved to develop similar information in the same industry

   NOTE: With the fourth criterion, an exemption cannot be denied solely on the grounds that insufficient expenses have been incurred to develop the information.

6.4 EFFECT OF CBI PROVISIONS ON INFORMATION AVAILABLE THROUGH WHMIS

A claim for exemption from requirements to disclose information has a number of consequences in the WHMIS information delivery system. At issue are the types of information which may be subject to exemption, the length of exemption periods, resulting changes to data sheets and labels, and the circumstances in which exempted information must or may be disclosed.

6.4.1 INFORMATION WHICH MAY BE THE SUBJECT OF A CLAIM FOR EXEMPTION

Under Section II of the Hazardous Materials Information Review Act, only certain types of information can be the subject of a claim for a disclosure exemption.

Suppliers may claim exemption for:

- the chemical identity or concentration of any ingredient of a controlled product; or
- the name of any toxicological study that identifies any ingredient of a controlled product; or

Employers may claim exemption for:

- the chemical identity or concentration of any ingredient of a controlled product; or
- the name of any toxicological study that identifies any ingredient of a controlled product; or
- the chemical name, common name, generic name, trade name or brand name of a controlled product; or
- information that could be used to identify a supplier of a controlled product.

6.4.2 LENGTH OF EXEMPTION PERIOD

Every person who files a claim for exemption in accordance with Section II of the HMIR Act is exempt from the requirement to divulge the information which is the subject of the claim:

- **For the period from the date the claim is filed to the final disposition of proceedings on the claim.** ("Proceedings" means any proceedings under the HMIR Act including the review of the claim by HMIRC, and any appeals to its decisions); and

- **Where the claim is determined to be valid, for a period of three years following the date at which proceedings in relation to the claim were complete**; i.e. for a period of three years from the date of the ruling by HMIRC where no appeal is undertaken or otherwise from the date of resolution of the appeal.

6.4.3 CHANGES TO DATA SHEETS AND LABELS REQUIRED WITH A CLAIM FOR EXEMPTION

Where a supplier or employer files a claim for exemption of information he or she is permitted to delete that information from the data sheet or label, as applicable*, on three conditions.

1. The deleted information must be of the type permitted, as described in Part 6.4.1. Model OSH Regulation prohibits employers from deleting hazard information from data sheets. General WHMIS policy is that physical data, hazard information, preventive measures and first-aid information may not be claimed as confidential.

2. Where the subject of the claim is the chemical identity of a controlled product or any ingredient of a controlled product, the supplier must disclose the generic chemical identity of the product or ingredient with **as much precision as is consistent with the exemptions** (Reference: HPA, Section 16).

   The identity of a product may be provided as a code name or code number specified by the supplier (Reference: CPR, Section 19[2]). Generic information on ingredients must provide or suggest all identifier information which is not pertinent to the claim for exemption. For example, in a claim which concerns the number of atoms of chlorine per molecule of a chlorinated propane rather than the fact that chlorine is the halogen which is present, the appropriate generic identity of the ingredient would be "chlorinated propane" rather than "halogenated propane".

3. The claimant must include additional claim information on the data sheet or labels where applicable, as follows:

   a) On filing a claim, the claimant must disclose the **date the claim was filed** and the **registration number** assigned to the claim by HMIRC. This information must be maintained on MSDS's/labels until the claimant is informed of a decision on the claim.

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* For example, a claim for exemption which concerns the name of a toxicological study is not likely to be applicable to labels .

b) Where a claim for exemption is determined to be valid the claimant must revise the MSDS and, where necessary, the label within 30 days of final disposition of the claim so as to display, in place of the date the claim was filed, a **statement that an exemption was granted**, and **the date of the decision granting the exemption**.

The date of final disposition is, where there is no appeal of the decision, the date of expiry of the appeal period; and where there is an appeal of a decision, the date of expiry of the appeal period that applies to the decision on the first appeal (unless that decision is appealed).

c) Claims which are approved by HMRIC may include an order for changes to the MSDS and/or label. Such changes must be made unless successfully appealed.

6.4.4 CIRCUMSTANCES IN WHICH EXEMPTED INFORMATION IS MADE AVAILABLE

There are two circumstances where information which is the subject of an exemption must be disclosed:

1. Suppliers and employers must provide information on a controlled product to any medical professional who requests that information for the purpose of medical diagnosis or treatment of a person in an emergency.

2. In circumstances of an appeal, the Appeal Board established under the HMIR Act may order a claimant to disclose in confidence to one or more affected parties information related to the subject matter of the appeal if, in the opinion of the Appeal Board, the information should be disclosed to protect health and safety in a workplace.

In addition, an official of the HMIR Commission may communicate information received from a supplier or employer concerning a claim for CBI to a medical professional who requests that information for the purpose of diagnosis or treatment of a person in an emergency, and to any official of:

- the Department of Consumer and Corporate Affairs for the purposes of administration or enforcement of Part II of the Hazardous Products Act;

- the Department of National Health and Welfare for the purpose of determining whether a material safety data sheet or label complies with the provisions of the Hazardous Products Act or of the Canada Labour Code;

- the Department of Labour for the purposes of the administration or enforcement of Part IV of the Canada Labour Code;

- the Department of Transportation for the purpose of making information available in cases of medical emergency through the Canadian Transport Emergency Centre; and to

- provincial OSH regulatory agencies for the purpose of administration or enforcement of any law of the province relating to occupational safety and health.

In all cases where confidential business information is disclosed the recipients are required to maintain the confidentiality of the information. The HMIR Act provides for penalty in the event of contravention of any provision of the Act, including unauthorized disclosure of information.

6.5 STRUCTURE AND OPERATION OF THE HAZARDOUS MATERIALS INFORMATION REVIEW COMMISSION

6.5.1 OVERVIEW OF THE COMMISSION

The Hazardous Materials Information Review Commission is an independent, quasi-judicial body which has the authority to review claims concerning confidential business information and to determine the regulatory compliance of product labels or MSDS's in relation to claims. Appeals to decisions are dealt with by the Commission through the convening of independent Appeal Boards to examine the Commission's original decisions.

The HMIRC organization, shown in Figure 1, includes both a Council of Governors and an administration which carries out daily operations.

1. Council of Governors

The Council is composed of individuals nominated by all the sectors involved in WHMIS: federal, provincial and territorial governments; business, including suppliers and employers, and organized labour. Governors are Order in Council appointees named by the Minister of Consumer and Corporate Affairs after consultation with organizations that are representative of each of the interest groups. The term of appointment is three years and neither an honorarium or expenses are provided. The first chairman is designated by the Governor-in-Council; subsequent chairmen will be elected by and from among the serving governors.

The Council must sit at least once a year. Its functions include making recommendations to the Minister of Consumer and Corporate Affairs on fees and procedures for examining claims.

2. Administration

The administration is headed by a President, appointed by the Governor-in-Council. The first President holds office during pleasure; subsequent Presidents will serve a term of five years. The administration functions through three main units: the Registry, the Screening Division and the Appeals Division.

- **The Registry** maintains security of claims information, provides financial, personnel and administrative services, and monitors fees. The Registry has links with CANUTEC in regard to provision of emergency information.
- **The Screening Division**, staffed by Screening Officers, assesses and makes decisions on all claims for exemption, and determines regulatory compliance of MSDS's and labels associated with claims.

FIGURE 1:

Organization Structure

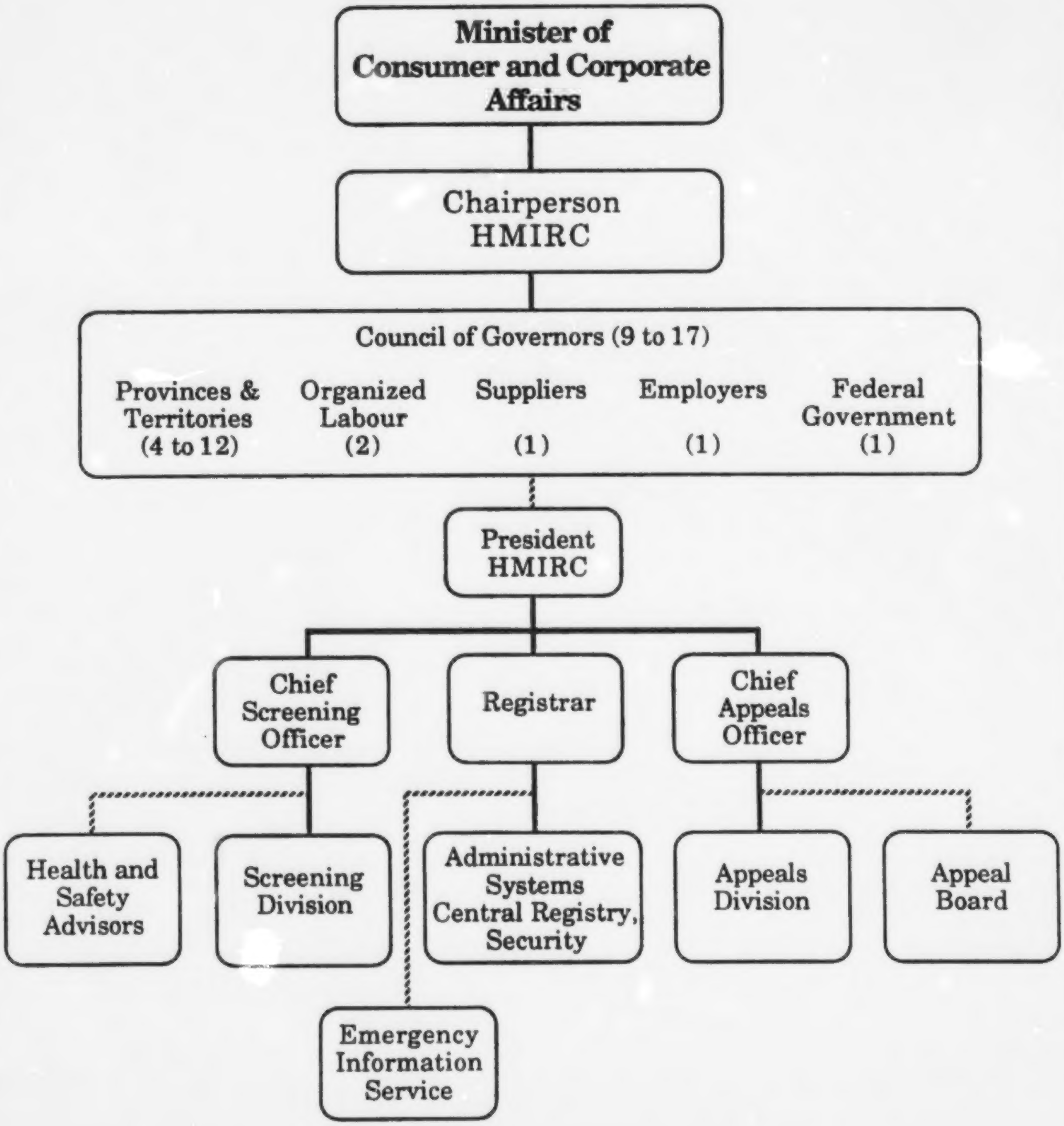
Minister of Consumer and Corporate Affairs
Chairperson HMIRC
Council of Governors (9 to 17)
Provinces & Territories (4 to 12)
Organized Labour (2)
Suppliers (1)
Employers (1)
Federal Government (1)
President HMIRC
Chief Screening Officer
Registrar
Chief Appeals Officer
Health and Safety Advisors
Screening Division
Administrative Systems Central Registry, Security
Appeals Division
Appeal Board
Emergency Information Service

Figure provided by HMIRC

- **The Appeals Division** deals with Commission decisions which are contested and arranges for the convening of independent Appeal Boards in appropriate provincial or territorial jurisdictions for handling contested claims.

3. Overview of the Claims Process

The basic steps a claim goes through with the Commission are as follows:

- Claims for exemption are **received** by the Commission with the Finance Branch of Consumer and Corporate Affairs processing the fee.
- Claims for exemption are **registered** in the HMIRC system, with assignment of a Registration Number, publication of registrations in the Canada Gazette, preparation of the claim for evaluation and conveying pertinent information such as emergency response data, to the Emergency Information Service.
- Claims for exemption are **screened** to determine whether they should be accepted or rejected based on economic criteria within the HMIR Regulations. Associated MSDS and label information is reviewed for compliance with requirements under HPA, the Canada Labour Code and, pursuant to Section 32 of the HMIR Act, with the applicable legislation of a province.
- Claimants or affected parties may **appeal** decisions on claims for exemption if they disagree with the original judgement.

Most of a claimant or appellant's interaction in this process with the Commission is likely to be with the Screening and Appeals Divisions.

6.5.2 THE SCREENING DIVISION

1. Functions of the Division

This Division, under the Chief Screening Officer is staffed by Screening Officers who have authority to make decisions on all aspects of the screening of claims.

The primary functions of the Screening Officers are to:

- **review claims** which request exemption from WHMIS reporting requirements;
- **rule on the validity of exemption claims** based on confidential business information criteria written in the HMIR Regulations;
- **consult with Health and Welfare** or other experts to determine the compliance of product labels and MSDS's with applicable legislation.

In carrying out screening duties, officers may require claimants to provide additional information on any aspect of the claim. All information revealed in the screening process is confidential.

FIGURE 2:

Claim Screening Process

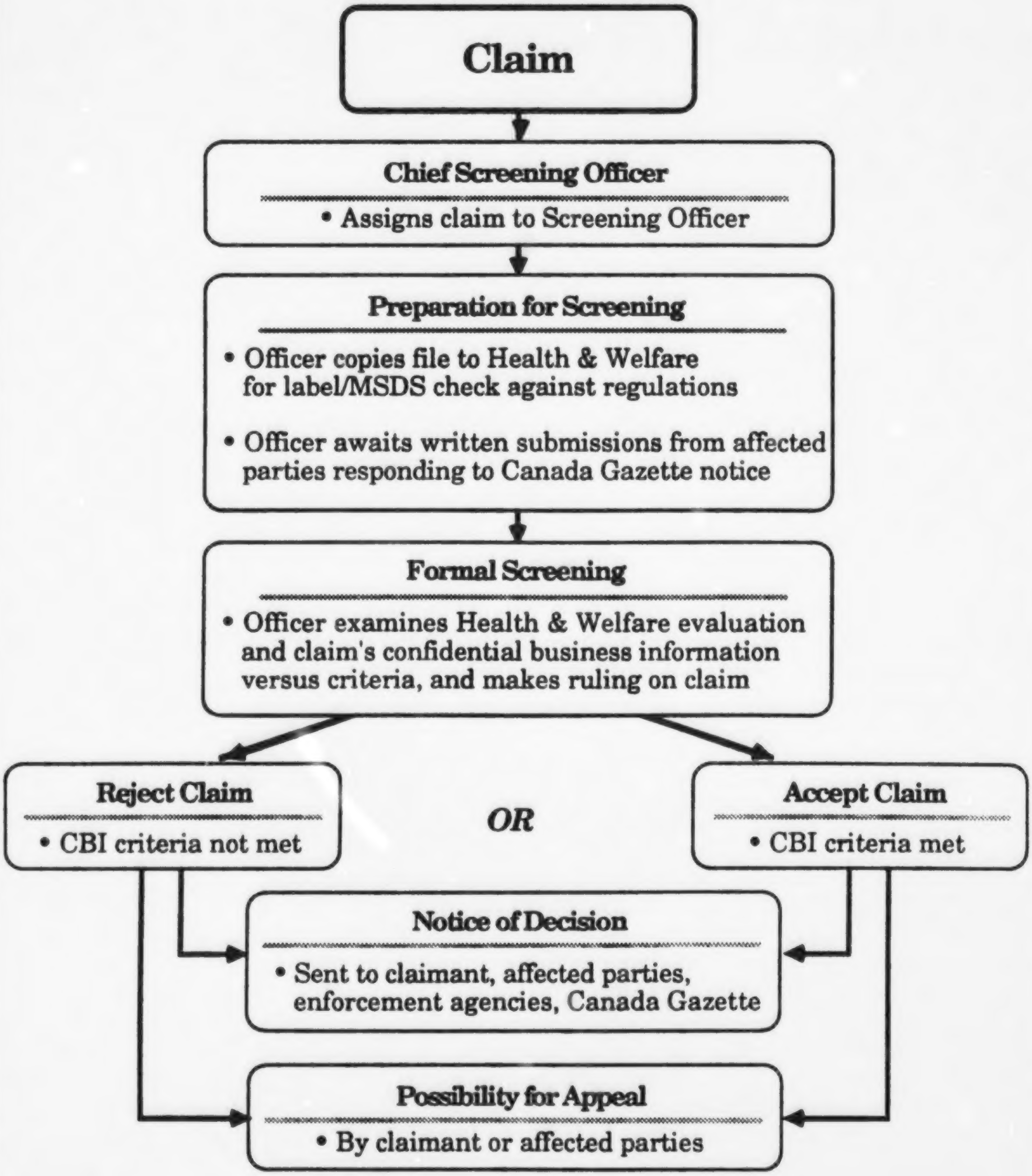
Claim
Chief Screening Officer
• Assigns claim to Screening Officer
Preparation for Screening
• Officer copies file to Health & Welfare for label/MSDS check against regulations
• Officer awaits written submissions from affected parties responding to Canada Gazette notice
Formal Screening
• Officer examines Health & Welfare evaluation and claim's confidential business information versus criteria, and makes ruling on claim
Reject Claim
• CBI criteria not met
OR
Accept Claim
• CBI criteria met
Notice of Decision
• Sent to claimant, affected parties, enforcement agencies, Canada Gazette
Possibility for Appeal
• By claimant or affected parties

Figure provided by HMIRC

2. The Claim Screening Process

Figure 2 provides a summary of the claim screening process.

- Once a claim is received and registered, the registered claim is sent to the Chief Screening Officer who assigns the claim to a Screening Officer based on priority and industry sector information.
- The assigned Screening Officer sends copies of the claims MSDS and label to Health and Welfare for examination regarding compliance with regulations, and gathers submissions about the claim which have been generated from the notice published in the Canada Gazette (which includes a deadline for responses).
- Screening is done by the officer based on Health and Welfare's evaluation, submissions in hand and the confidential business and claim justification information in relation to the criteria for exemption.
- Once a decision is made, the claimant receives a copy of the decision. Claims which are approved may include an order for changes to MSDS and/or label information. Affected parties who made written submissions and the appropriate provincial, territorial or federal OSH enforcement agencies receive notice that a decision has been made accepting or rejecting the claim. The ruling is also published in the Canada Gazette. In either case, the decision can be appealed by a claimant or affected parties.

An unsuccessful claim can be ruled either partially or completely invalid. Partially invalid claims can be resubmitted by claimants after they comply with the order for changes. Claims ruled completely invalid cannot be resubmitted but can be appealed.

If a claim is disallowed, the supplier has the right to withdraw the product from the market without disclosing the information which was the subject of the claim.

6.5.3 THE APPEALS DIVISION

1. Functions of the Division

An appeal of a screening decision may be launched by either an owner of proprietary information or by a party, such as workers or their representatives, who are affected by the decision.

The Appeal Division, headed by the Chief Appeals Officer, is responsible for the administrative work to establish Appeal Boards to hear cases resulting from appeals to Screening Division decisions on claims. The primary functions of this Division are to:

- **receive appeals** on HMIRC decisions;
- **maintain lists of potential Appeal Board members** in each jurisdiction from names put forward by industry, labour and government in the respective jurisdiction;
- **in consultation with Lieutenant-Governors-in-Council, appoint individuals to sit as Chairmen of Appeal Boards**;
- **administer Appeal Boards** in jurisdictions appropriate to each appeal case; and to
- **notify claimants and affected parties** of Appeal Board decisions.

NOTE: Each Appeal Board will consist of a panel of three persons, one representative each from industry, labour and government. While Boards are administered by the Appeals Division of the Commission, they are independent of the Commission with respect to their powers to decide the outcome of the appeal.

2. The Appeals Process

Figure 3 provides a summary of the claims appeal process.

- Appeals may be made by appellants regarding an order for compliance, decision by a Screening Officer, or an Appeal Board decision.

NOTE: Appellants can be either claimants or affected parties,* i.e.:

- **supplier, employer, employee;**
- **employee representatives, including relevant trade union staff and officers; or**
- **health and safety committee members.**

- The appeal process begins when the appellant files a statement of appeal with the Chief Appeals Officer, in writing, accompanied by a filing fee.
- An Appeal Board is convened to hear the case; typically in the province where the claimant carries on most of his or her business. The Chief Appeals Officer (CAO) appoints the Appeal Board Chairman in consultation with the Lieutenant-Governor-in-Council of a province where the appeal will be heard. The Chairman of the Appeal Board then appoints industry and labour representatives from lists of potential Appeal Board members maintained by the CAO. The CAO then notifies the claimant and each affected party who has made a written submission on the case of the names of members of the board and where it will convene.
- The Appeal Board hearing includes a review of the written report of the Screening Officer whose decision or order is being appealed, the statement of appeal, submissions made concerning the appeal by the claimant or any affected party, and the criteria or regulations defining confidential business information which pertain to the case. Proceedings are confidential.
- The owner of proprietary information under discussion can request limited distribution of that information, when justified. The Appeal Board has the power to order a claimant to disclose, in confidence to affected parties, any information pertaining to the subject matter of the claim on appeal which, in the Board's opinion, should be disclosed to ensure health and safety in the workplace.

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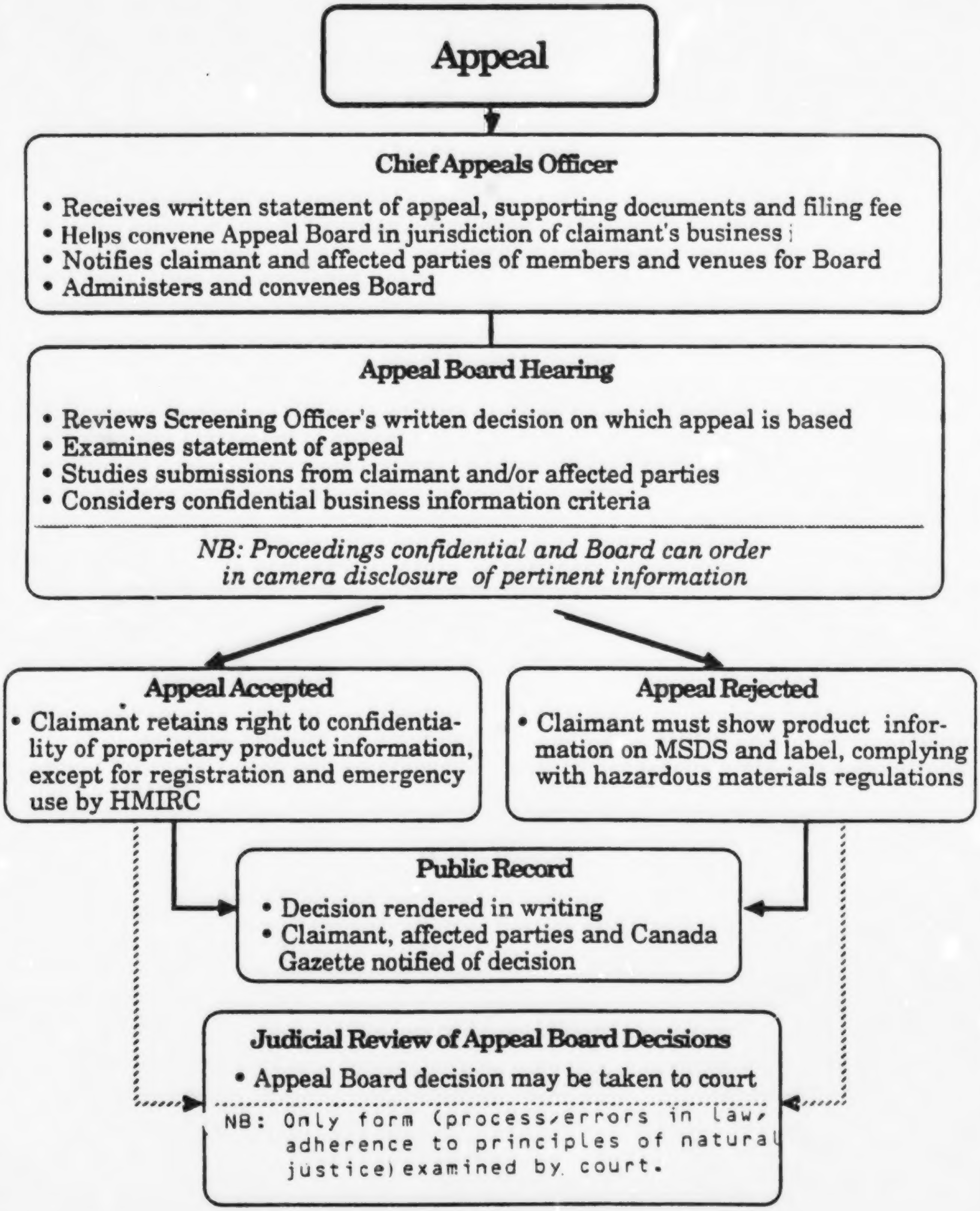
* This is a working definition of "affected party". The term will be legally defined by regulation prior to 31 October 1988.

FIGURE 3:

Appeal Process for Claims



Appeal

Chief Appeals Officer

- Receives written statement of appeal, supporting documents and filing fee
- Helps convene Appeal Board in jurisdiction of claimant's business
- Notifies claimant and affected parties of members and venues for Board
- Administers and convenes Board

Appeal Board Hearing

- Reviews Screening Officer's written decision on which appeal is based
- Examines statement of appeal
- Studies submissions from claimant and/or affected parties
- Considers confidential business information criteria

NB: Proceedings confidential and Board can order in camera disclosure of pertinent information

Appeal Accepted

- Claimant retains right to confidentiality of proprietary product information, except for registration and emergency use by HMIRC

Appeal Rejected

- Claimant must show product information on MSDS and label, complying with hazardous materials regulations

Public Record

- Decision rendered in writing
- Claimant, affected parties and Canada Gazette notified of decision

Judicial Review of Appeal Board Decisions

- Appeal Board decision may be taken to court

NB: Only form (process, errors in law, adherence to principles of natural justice) examined by court.

Figure provided by HMIRC

- The final outcome of the appeal process is either acceptance or rejection of the appeal. The claimant receives a copy of the decision. Notice of the decision is sent to affected parties who made written submissions and is published in the Canada Gazette.

- In some cases, a decision of an Appeal Board may be appealed by either a claimant or affected party through the federal court system. Such judicial reviews may consider the **form** by which a decision is reached (process, errors in law, adherence to principles of natural justice), **not the content** of the Appeal Board decision.

6.6 HOW TO FILE A CLAIM OR APPEAL A DECISION

The address to use for correspondence with HMIRC is **Hazardous Material Information Review Commission, Place Vanier, 355 River Road, Tower B, 17th Floor, Vanier, Ontario, K1A 0C9. The telephone number is: (613) 954-2441. FACS: (613) 954-9652.**

6.6.1 FILING A CLAIM

Claims for exemption include the following items:*

1. Confidential Business Information

   Three (3) copies of the confidential business information for which the claim for exemption is being sought, forwarded in a separate envelope, sealed with a company seal if possible.

2. Material Safety Data Sheets

   Three (3) copies of the MSDS for the product for which exemption is being claimed. MSDS information must be complete and in compliance with regulatory legislation on controlled products.

3. Product Label

   Three (3) copies of the product label which are complete and which meet regulatory requirements.

4. Justification for Claim

   One (1) copy of the claimant's explanation justifying the validity of the claim. It should be written in such a way as to avoid stating the confidential business information directly unless sealed in the envelope with the CBI.

5. Corporate Information

   The full corporate name and address of the claimant's company must be indicated.

6. Corporate Contact

   The name and telephone number of the chief corporate contact dealing directly with the claim must be provided.

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* Items and numbers of copies are a matter of policy at this time. Required material and number of copies will be finalized by regulation prior to 31 October 1988.

7. Fee Payment

A cheque payable to the **Receiver General of Canada** in the amount required for each product claimed must be included. See Part 6.6.3 of this Chapter for guidance on fees.

6.6.2 APPEALING A DECISION ON A CLAIM

An appeal may be made by a claimant or affected party regarding:

- an order for compliance;
- a decision by a Screening Officer; or
- an Appeal Board decision.

An affected party may be a supplier who supplies the product to the employer who is the claimant (or conversely the employer who receives the product from the supplier who is the claimant), an employee, an employee representative (including relevant trade union staff or officers), and health and safety committee members.

The appeal process commences when the appellant files a **statement of appeal** with the Chief Appeals Officer. The statement must:

- be in writing;
- provide the grounds and supporting material for the appeal; and
- be accompanied by the required filing fee.

The intent of the appeal must be filed in a form and manner prescribed by regulations.

Appeals of an order for compliance or a decision by a Screening Officer are based on the content of the decision. An appeal of a decision of an Appeal Board to the federal courts must be based on the form (process, errors in law or adherence to the principles of natural justice) by which the Appeal Board reached its decision rather than on the content of the decision itself.

6.6.3 FILING FEES

The Commission is set up to be self-financing, thereby minimizing the cost of its operation to government. It has the authority to charge fees to cover screening and appeal costs, and must set fees high enough to generate sufficient revenue but low enough to maintain accessibility for all parties to the protection afforded by the Commission.

Fees will be fixed for three-year periods, and will eventually be experienced-based; i.e. based on average annual costs divided by the annual numbers of claims and appeals over the three-year cycle.

The Council of Governors is responsible for reviewing changes in fee structure proposed by the administration and for recommending changes to the Minister of Consumer and Corporate Affairs for approval.

The proposed initial fee structure* for the Commission is:

- **claim fee** paid by the claimant of proprietary information to the Commission -- a maximum of $1,800 to include a basic fee for the claim and one ingredient in the product and $100 for each additional ingredient;

- **appeal filing fee** paid by the appellant to the Commission -- $2,000.

In some cases it will be permissible for a claimant to include more than one product in one claim for exemption (called a multiple filing*) where the additional product(s) contain the same ingredient(s) which is/are the subject of the claim and the ingredient(s) have the same function in the products (i.e. the ingredients are both adhesives, thinners, etc.).

It is understood that the appeals process will be more costly to the Commission than the screening process and that appeals costs are in part covered by claims fees.

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* The area of fees and multiple filings is under review and the information provided here is for educational purposes only.

CHAPTER 7

RESOURCES

CONTENTS

Page

7.1 CHAPTER OBJECTIVES 1

7.2 CONTACTING AGENCIES AND ORGANIZATIONS 3

  7.2.1 REGULATORY AGENCIES ASSOCIATED WITH WHMIS 3

  7.2.2 AGENCIES AND ORGANIZATIONS REFERENCED IN WHMIS LEGISLATION 6

  7.2.3 OTHER INFORMATION AND POLICY ORGANIZATIONS 7

7.3 REFERENCE DOCUMENTS SPECIFIED IN WHMIS LEGISLATION 9

7.4 COMPUTERIZED INFORMATION SOURCES 12

7.5 DATA SHEET COLLECTIONS IN PRINT 15

7.6 GENERAL HYGIENE REFERENCE TEXTS 16

7.7 PERIODICALS 22

7.8 REFERENCES FOR FURTHER INFORMATION ON RESOURCES 24

7.1 CHAPTER OBJECTIVES

The implementation of a hazardous materials information system requires the effective use of resource material. The objectives of this Chapter are:

Objectives	Location in Chapter
• To provide means of contacting regulatory agencies associated with WHMIS, and agencies and organizations referenced in WHMIS legislation or which are otherwise recognized as sources of information on hazardous materials.	7.2
• To list the documents specified by the *Controlled Products Regulations* for use when classifying products.	7.3
• To provide descriptions and sources of major computerized hazard databases.	7.4
• To provide a partial list of data sheet collections.	7.5
• To provide a list of generally recognized basic occupational hygiene texts.	7.6
• To provide a list of generally recognized periodicals which specialize in toxicology and occupational hygiene.	7.7
• To provide references which can be used to search further for hygiene-related databases and publications.	7.8

NOTE: The intent of this Chapter is to provide a comprehensive, not necessarily complete, list of resources for information on the field of occupational hygiene and toxicology, from which specific references can be selected to assemble information on particular controlled products. Descriptions are provided of the information contained in databases (Part 7.4) and occupational hygiene texts (Part 7.6) to assist with selecting the information source(s) applicable to specific concerns. This Chapter is not intended as a minimum search list, an issue which is addressed elsewhere. (See page 11 of Chapter 2 "Classification" or pages 11 and 12 of Chapter 5 "Worker Education".)

7.2 CONTACTING AGENCIES AND ORGANIZATIONS

This Part provides addresses and telephone numbers for three groups of agencies and organizations:

- those involved as representatives in the development of WHMIS legislation;
- those which are referenced in WHMIS legislation;
- other general information and policy organizations.

No list of agencies is complete. There are, for example, many industry and labour organizations not listed here which provide hazardous materials information in various sectors of the economy.

7.2.1 REGULATORY AGENCIES ASSOCIATED WITH WHMIS

1. Federal Government

Labour Canada

5th Floor, Place du Portage
Hull, Québec
K1A 0J2
Tel: (819) 953-0160

Hazardous Materials Information Review Commission

Place Vanier
355 River Road
Tower B, 17th Floor
Vanier, Ontario
K1A 0C9
Tel: (613) 954-2441

Consumer and Corporate Affairs

Product Safety Branch
Consumer and Corporate Affairs
Ottawa, Ontario
K1A 0C9
Tel: (613) 997-1194

Health and Welfare Canada

Industrial Chemicals
Product Safety Section
Health Protection Branch
Health and Welfare Canada
Tunney's Pasture
Ottawa, Ontario
K1A 0L2
Tel: (819) 957-1880

2. Provinces and Territories

Alberta

Occupational Health and
Safety Division
Community and Occupational
Health
10709 Jasper Avenue
Edmonton, Alberta
T5J 3N3
Tel: (403) 427-2687

British Columbia

Occupational Safety and
Health Division
Workers' Compensation Board
6951 Westminster Highway
Richmond, B.C.
V7C 1C6
Tel: (604) 273-2266

Manitoba

Workplace Safety and
Health Division
Department of Environment
and Health
1000-330 St. Mary Avenue
Winnipeg, Manitoba
R3C 3Z5
Tel: (204) 945-3605

New Brunswick

Health and Safety Services
Occupational Health and
Safety Commission
500 Beaverbrook Court
4th Floor, Box 6000
Fredericton, New Brunswick
E3B 5H1
Tel: (506) 453-2467

Newfoundland

Occupational Health and
Safety Branch
Department of Labour
PO Box 4750
St. John's, Newfoundland
A1C 5T7
Tel: (709) 576-5531

Northwest Territories

Safety Division
Justice and Public Service
Government of Northwest
Territories
Box 1320
Yellowknife, NWT
X1A 2L9
Tel: (403) 873-7468

Nova Scotia

Occupational Health and
Safety Division
Department of Labour
5151 Terminal Road
Box 697
Halifax, Nova Scotia
B3J 2T8
Tel: (902) 424-4328

Ontario

Ontario Ministry of Labour
Strategic Policy Unit
400 University Avenue
14th Floor
Toronto, Ontario
M7A 1T7
Tel: (416) 965-2493

Prince Edward Island

Occupational Health and
Safety Division
Department of Labour
3 Queen Street
PO Box 2000
Charlottetown, PEI
C1A 7N5
Tel: (902) 892-3416

Québec

Commission de la Santé et
de la Securité du Travail
du Québec
1199 rue de Bleury
Montréal, PQ
H3C 4E1
Tel: (514) 873-7545

Saskatchewan

Occupational Health and
Safety Branch
Department of Labour
1870 Albert Street
6th Floor
Regina, Saskatchewan
S4P 3V7
Tel: (306) 787-4496

Yukon

Labour Services
Consumer and Corporate
Affairs Branch
Department of Justice
Government of the Yukon
Box 2703
Whitehorse, YT
Y1A 2C6
Tel: (403) 667-5069

7.2.2 AGENCIES AND ORGANIZATIONS REFERENCED IN WHMIS LEGISLATION

American Conference of Governmental Industrial Hygienists (ACGIH)

6500 Glenway Avenue, Building D-7
Cincinnati, Ohio
USA 45211
Tel: (513) 661-7881

American Society for Testing and Materials (ASTM)

1916 Race Street
Philadelphia, Pennsylvania
USA 19103
Tel: (215) 299-5400

International Agency for Research on Cancer (IARC) Publications

Canadian Public Health Association
1335 Carling Avenue, Suite 210
Ottawa, Ontario
K1Z 8N8
Tel: (613) 725-3769

OR

IARC
150 Cours Albert Thomas
F - 69372
Lyon, Cedex 03
France

National Association of Corrosion Engineers (NACE)

PO Box 218340
Houston, Texas
USA 77218
Tel: (713) 492-0535

Organization for Economic Cooperation and Development (OECD) Publications

Renouf Publishing Co.
PO Box 1008, Station B
61 Sparks Street
Ottawa, Ontario
K1P 5R1
Tel: (613) 741-4333

OR

OECD Publications Service
2, rue André-Pascal
75775 Paris, Cedex 16
France

US Government Standards

Superintendent of Documents
US Government Printing Office
Washington, DC
USA 20402
Tel: (202) 783-3238

7.2.3 OTHER INFORMATION AND POLICY ORGANIZATIONS

Canadian Centre for Occupational Health and Safety (CCOHS)

250 Main Street East
Hamilton, Ontario
L8N 1H6
Tel: 1-800-263-8276

Canadian Chemical Producers' Association

805 - 350 Sparks Street
Ottawa, Ontario
K1R 7S8
Tel: (613) 237-6215

Canadian Labour Congress

2841 Riverside Drive
Ottawa, Ontario
K1V 8X7
Tel: (613) 521-3400

Canadian Manufacturers' Association

1 Yonge Street, 14th Floor
Toronto, Ontario
M5E 1J9
Tel: (416) 363-7261

Canadian Standards Association

178 Rexdale Boulevard
Rexdale, Ontario
M9W 1R3
Tel: (416) 747-4044

CANUTEC

Information and Emergency Centre
Transport of Dangerous Goods Branch
Transport Canada
Place de Ville
Ottawa, Ontario
K1A 0N5
(Emergency Telephone: [613] 996-6666)

Medical Research Council of Canada

20th Floor, Jeanne Mance Building
Tunney's Pasture
Ottawa, Ontario
K1A 0W9
Tel: (613) 954-1809

National Institute for Occupational Safety and Health (NIOSH)

Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati, Ohio
USA 45226
Tel: (513) 684-8236

7.3 REFERENCE DOCUMENTS SPECIFIED IN WHMIS LEGISLATION

Part IV of the *Controlled Products Regulations* specifies test methods and classification lists for use when evaluating whether or not a product is a controlled product within the meaning of Classes A, B, D, E and F.

CLASS A - COMPRESSED GASES

- Standard Test Method for Vapour Pressure of Petroleum Products (Reid Method), ASTM D323-82, dated August 27, 1981.

CLASS B - FLAMMABLE AND COMBUSTIBLE MATERIAL

- Standard Test Methods for Flashpoint by Pensky-Martens Closed Tester, ASTM D93-80, dated August 29, 1980.
- Standard Test Methods for Flash Point by Setaflash Closed Tester, ASTM D3828-81, dated August 28, 1981.
- Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus, ASTM D3278-8, dated August 28, 1981.
- Standard Test Method for Flash Point by Tag Closed Tester, ASTM D56-82, dated August 27, 1982.
- Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity), ASTM D445-83, dated October 28, 1983.

CLASS D - POISONOUS AND INFECTIOUS MATERIAL

Nine categories of health effects are listed for poisonous materials in the *Controlled Products Regulations*. The regulations specify tests and references for eight.

1. ACUTE LETHAL EFFECTS

    - OECD Test Guideline No. 401, "Acute Oral Toxicity", dated May 12, 1981.
    - OECD Test Guideline No. 402, "Acute Dermal Toxicity", dated May 12, 1981.
    - OECD Test Guideline No. 403, "Acute Inhalation Toxicity", dated May 12, 1981.

2. CHRONIC TOXIC EFFECTS

    - OECD Test Guideline No. 408, "Subchronic Oral Toxicity -- Rodent: 90 day", dated May 12, 1981.

- OECD Test Guideline No. 409, "Subchronic Oral Toxicity -- Non Rodent: 90 day", dated May 12, 1981.
- OECD Test Guideline No. 411, "Subchronic Dermal Toxicity: 90 day", dated May 12, 1981.
- OECD Test Guideline No. 413, "Subchronic Inhalation Toxicity: 90 day", dated May 12, 1981.
- OECD Test Guideline No. 452, "Chronic Toxicity Studies", dated May 12, 1981.
- Tests or Methods described in US Food and Drug Administration (FDA) or Environmental Protection Agency Guidelines as published in the US Federal Register.

3. CARCINOGENICITY

- Threshold Limit Values and Biological Exposure Indices, published by the ACGIH, as amended from year to year.
- IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, published by the World Health Organization, as amended from time to time.

4. MUTAGENICITY

- "Introduction to the OECD Guidelines on Genetic Toxicology Testing and Guidance on the Selection and Application of Assays", dated March 1, 1987, published in the Third Addendum to the OECD Guidelines for Testing of Chemicals.
- Guidelines on the Use of Mutagenicity Tests in the Toxicological Evaluation of Chemicals, dated 1986, published under the authority of the Minister of National Health and Welfare and the Minister of the Environment.
- "Proposed Guidelines for Registering Pesticides in the US; Hazard Evaluation, Human and Domestic Animals", published in Volume 43 of the US Federal Register (No. 163), dated 1973, on pages 37,336-37,403.

5. TERATOGENICITY AND EMBRYOTOXICITY

- OECD Test Guideline No. 414, "Teratogenicity", dated May 12, 1981.
- OECD Test Guideline No. 415, "One-Generation Reproduction Toxicity", dated May 26, 1983.
- OECD Test Guideline No. 416, "Two-Generation Reproduction Toxicity", dated May 26, 1983.

- Principles for the Testing of Drugs for Teratogenicity, Technical Report Series Number 364, published by the World Health Organization, 1967.

6. REPRODUCTIVE TOXICITY

- OECD Test Guideline No. 415, "One-Generation Reproduction Toxicity", dated May 26, 1983.
- OECD Test Guideline No. 416, "Two-Generation Reproduction Toxicity", dated May 26, 1983.

7. SKIN OR EYE IRRITATION

- OECD Test Guideline No. 404, "Acute Dermal Irritation/ Corrosion", dated May 12, 1981.
- OECD Test Guideline No. 405, "Acute Eye Irritation/Corrosion", dated May 12, 1981.
- Draize Test as described in Volume 82 of The Journal of Pharmacology and Experimental Therapeutics, dated 1944, pages 377 to 390.

8. SKIN SENSITIZATION

- OECD Test Guideline No. 406, "Skin Sensitization", dated May 12, 1981.

CLASS E - CORROSIVE MATERIAL

- Test Method, Laboratory Corrosion Testing of Metals for the Process Industries, NACE Standard TM-01-69 (1976 Revision).
- OECD Test Guideline No. 404, "Acute Dermal Irritation/Corrosion, dated May 12, 1981.

CLASS F - DANGEROUSLY REACTIVE MATERIAL

- OECD Test Guideline No. 403, "Acute Inhalation Toxicity", dated May 12, 1981.

7.4 COMPUTERIZED INFORMATION SOURCES

Three types of databases on hazardous materials are available: dictionary, informational and bibliographic.

7.4.1 DICTIONARY DATABASES help to identify chemicals by linking names of chemicals with identification numbers, chemical structure, and the location of toxicological information in other database files. Such databases are helpful with the Product Information and Hazardous Ingredients Sections of the MSDS.

Examples:

- CHEMLINE: Produced by Chemical Abstracts Service, Columbus, Ohio. Available through the MEDLARS system of the National Library of Medicine.
- CHEMNAME and CHEMSIS: Available on DIALOG.
- CAS Registry: Available on CAS ONLINE.

7.4.2 INFORMATIONAL DATABASES contain condensed, practical information on topics such as human health hazards, first aid, safety and handling. Information is in a form which assists with filling out or evaluating most sections of material safety data sheets.

Examples:

- CIOL (Chemical Information On-line): Produced in two parts by the Canadian Centre for Occupational Health and Safety, Hamilton, Ontario:
  - CHEMINFO: Detailed, practical information on substances, including chemical and physical properties, toxicity, personal protection, storage, handling, and first aid. Written in non-technical language.
  - TN (Tradename Products): Information on hazards and safety precautions based on data sheets voluntarily provided by manufacturers.
- HAZARDLINE: Produced by Occupational Health Services Inc., Secaucus, New Jersey, USA. Records can be lengthy because emphasis is placed on full texts. Information is drawn largely from standard reference texts, rather than up-to-date journals. Updated monthly.

- RTECS (The Registry of Toxic Effects of Chemical Substances Online): Prepared by NIOSH and available through MEDLARS/TOXNET. Contains summary toxicity information for more than 61,000 substances. If no toxicity data on a chemical exists in RTECS, it is unlikely data exists. Citations do not include author, name or article title, and information is not subject to review other than by the original journal of publication. Updated quarterly.

- TDB/HSDB (Toxicology Data Bank/Hazardous Substances Databank): Part of the US National Library of Medicine TOXNET system. Contains information on chemical and physical properties, toxic effects, standards and regulations, environmental fates, safety and handling.

7.4.3 BIBLIOGRAPHIC DATABASES list citations, usually of abstracts or summaries of the reported data. Bibliographic databases rarely provide information which can be applied immediately and additional legwork is needed to collect and interpret data.

Examples:

- CIS/ILO: Produced by the Centre International d'Information de Securite et d'Hygiene du Travail at the International Labour Office, Geneva, and available through CCOHS. Information is provided in three sections:

    - hazards, pathology and control measures;
    - industries and operations;
    - general problems -- e.g. law, occupational medicine.

  About 3,600 new records are added each year. Full text articles for each citation are stored under accession numbers at CCOHS.

- Chemical Exposure: Produced by Chemical Effects Center at Oak Ridge National Laboratory, Tennessee, and provides body burden information, i.e. data on chemicals that have been identified in human and animal tissues as a result of environmental exposure. Available through Dialog.

- HSELINE: Produced by the Health and Safety Executive, UK. Approximately 250 journals are scanned, from 1977 to the present. Available in Canada through Pergamon.

- NIOSHTIC: Produced by NIOSH. Provides author, title, place, publisher and date. Covers literature dating to 1800's. Available in Canada through CCOHS, Dialog and Pergamon.

- TOXLINE: Extensive database produced by US National Library of Medicine and available through MEDLARS system. Sources include MEDLINE, chemical abstracts, CIS abstracts, EPA and NTIS. Some idiosyncrasies in how data is filed and searched.
- Others: Databases such as BIOSIS (available through Dialog and the National Research Council), EMBASE (produced by Excerpta Medica and available through Dialog) and MEDLINE (available through Dialog and the NRC) contain information related but not specific to toxicology and industrial health. As a result, good information-searching skills are needed.

7.5 DATA SHEET COLLECTIONS IN PRINT

This Part provides addresses of some vendors of printed collections of material safety data sheets. See Part 7.4 for collections available by computer. WARNING: While many of these documents are useful, they are unlikely to be sufficient information sources when assembling data sheets meeting WHMIS requirements.

7.5.1 COMPENDIUM OF SAFETY DATA SHEETS FOR RESEARCH AND INDUSTRIAL CHEMICALS,

by Keith and Walters

VCH Publishers, Inc.
Suite 909 - 220 East 23rd Street
New York, NY
USA 10010-4606

7.5.2 HAZARD DATA BANK SHEETS

Paramount Publishing Ltd.
17 - 21 Shenley Road, Borehamwood
Hertfordshire WD6 1RT
UK

7.5.3 HAZARDOUS CHEMICALS DATA BOOK

G. Weiss, Editor
Noyes Data Corporation
Park Ridge, New Jersey
USA

7.5.4 MATERIAL SAFETY DATA SHEETS

Genium Publishing Corp.
1145 Catalyn Street
Schenectady, NY
USA 12303-1836

7.5.5 OCCUPATIONAL SAFETY AND HEALTH DATA SHEETS

Canada Safety Council
1765 St. Laurent Blvd.
Ottawa, Ontario
K1G 3V4

7.6 GENERAL HYGIENE REFERENCE TEXTS

7.6.1 BIOSAFETY IN MICROBIOLOGICAL AND BIOMEDICAL LABORATORIES

US Department of Health and Human Services
US Government Printing Office
Washington, DC
USA 20402

Provides hazard classification for arboviruses and associated safe laboratory practice.

7.6.2 CLINICAL TOXICOLOGY OF COMMERCIAL PRODUCTS

By Goselin, Smith et al.
Williams and Wilkins
Baltimore, Maryland
USA

Provides lists of ingredients of various commercial products and toxicological reviews of some ingredients.

7.6.3 CODE OF PRACTICE FOR THE PREVENTION OF INFECTION IN CLINICAL LABORATORIES AND POST MORTEM ROOMS

Department of Health and Social Security
Her Majesty's Stationery Office
49 High Holborn
London, UK
WC1V 6HB

Provides hazard classification of microorganisms and associated safe practice information.

7.6.4 CONTROL OF COMMUNICABLE DISEASES IN MAN

Abram Benenson, Editor
American Public Health Association
1015 Fifteenth Street NW
Washington, DC
USA 20005

A review of reservoirs, modes of transmission and control measures for approximately 200 microbiological disease agents.

7.6.5 CSA STANDARD Z94.4-M1982: SELECTION, CARE AND USE OF RESPIRATORS

Canadian Standards Association
178 Rexdale Boulevard
Rexdale, Ontario
M9W 1R3

7.6.6 DANGEROUS GOODS GUIDE TO INITIAL EMERGENCY RESPONSE - CANUTEC

Canadian Government Publishing Centre
Supply and Services Canada
Ottawa, Ontario
K1A 0S9

Provides summary emergency information on dangerous chemicals by product identification numbers in conjunction with the TDG Act.

7.6.7 DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS

By Irving Sax et al.
Van Nostrand Reinhold
New York, NY
USA

Provides summary chemical, physical, toxicological, incompatibility, and fire-related information on a wide variety of chemicals. Can be used in conjunction with Hazardous Chemicals Information Annual (see Periodical #9) which provides updates on specific chemicals.

7.6.8 DOCUMENTATION OF THE THRESHOLD LIMIT VALUES AND BIOLOGICAL EXPOSURE INDICES

ACGIH Inc.
6500 Glenway Avenue, Building D-7
Cincinnati, Ohio
USA 45211

Summary statements, which reflect the information considered by the ACGIH when assigning TLV's, are provided for more than 600 substances.

7.6.9 FIRE PROTECTION GUIDE ON HAZARDOUS MATERIALS

National Fire Protection Association
470 Atlantic Avenue
Boston, Massachussetts
USA 02210

Provides hazard information particularly related to fires, explosions and decomposition products for a wide variety of materials.

7.6.10 GUIDELINES FOR THE HANDLING OF RECOMBINANT DNA MOLECULES AND ANIMAL VIRUSES AND CELLS

Publications
Medical Research Council of Canada
20th Floor, Jeanne Mance Building
De L'Eglantine Street
Tunney's Pasture
Ottawa, Ontario
K1A 0W9

Provides classification of viruses by level of hazard and standards of laboratory practice.

7.6.11 HANDBOOK OF CHEMISTRY AND PHYSICS

CRC Press
18901 Cranwood Parkway
Cleveland, Ohio
USA 44128

Provides detailed information on physical data for chemical substances.

7.6.12 HANDBOOK OF INDUSTRIAL TOXICOLOGY

By E.R. Plunkett, MD
Chemical Publishing Co. Inc.
New York, NY
1987

Provides clear synopsis of information on routes of entry, mode of action, signs and symptoms of exposure, diagnostic tests and treatment for approximately 500 chemicals.

7.6.13 HANDBOOK OF TOXIC AND HAZARDOUS CHEMICALS AND CARCINOGENS, 2nd edn.

By Marshall Sittig
Noyes Publications
Park Ridge, New Jersey
USA

Provides synopsis of exposure limits, routes of entry, harmful effects, protective and disposal methods for approximately 1,000 chemicals.

7.6.14 INDUSTRIAL VENTILATION: A MANUAL OF RECOMMENDED PRACTICE

Committee on Industrial Ventilation
ACGIH
Lansing, Michigan
USA

Provides technical information on ventilation systems including a table on dilution volumes for various solvents.

7.6.15 MARTINDALE - THE EXTRA PHARMACOPOEIA

Reynolds and Prasad, Eds.
Pharmaceutical Press
London, UK

Provides detailed physical, chemical, toxicological and treatment information on pharmaceutical chemicals.

7.6.16 MATHESON GAS DATA BOOK

By Braker and Mossman
Matheson Gas Products Inc.
Secaucus, NJ
USA 070904

Provides detailed physical data on more than 100 gases.

7.6.17 THE MERCK INDEX - AN ENCYCLOPEDIA OF CHEMICALS, DRUGS AND BIOLOGICALS

Windholz, Budavari et al., Editors
Merck and Co. Inc.
Rahway, New Jersey
USA

Provides summary physical, chemical and acute toxicological information on various chemicals, including drugs and cosmetics.

7.6.18 NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) PUBLICATIONS

Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati, Ohio
USA 45226

NIOSH produces publications such as:

- Criteria Documents on specific substances that provide a detailed discussion of toxic effects and likelihood of exposure.

- Occupational Health Guidelines for Chemical Hazards which review hazard control information on various substances in a format similar to data sheets.

- Pocket Guide to Chemical Hazards, September 1978. Provides a quick reference to toxicological and physical data on chemicals and a respirator selection guide.

- RTECS: Registry of Toxic Effects of Chemical Substances. Summary chemical and toxicological information on more than 61,000 substances. (RTECS is also available as a database.)

7.6.19 PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY

Clayton and Clayton, Eds.
Wiley-Interscience Publication
John Wiley and Sons
NY, USA

A five-volume publication on both occupational hygiene practices and toxicology of specific chemicals.

7.6.20 PESTICIDES STUDIED IN MAN

By W.J. Hayes
Williams and Wilkins
428 East Preston Street
Baltimore, Maryland
USA 21202
1982

Detailed toxicological information on a wide variety of individual and chemical families of pesticide.

7.6.21 REPRODUCTIVE HAZARDS OF INDUSTRIAL CHEMICALS: AN EVALUATION OF ANIMAL AND HUMAN DATA

By Barlow and Sullivan
Academic Press
1982

A review of the field of reproductive effects analysis and a detailed discussion of the reproductive effects of approximately 50 chemicals and chemical groups.

7.6.22 TOXICOLOGY OF THE EYE

W. Morton Grant
Charles C. Thomas Publishers
Springfield, Illinois
USA

7.6.23 ZOONOSES AND THE ORIGINS AND ECOLOGY OF HUMAN DISEASE

Richard Fiennes
Academic Press
New York, 1978

Provides a review of diseases transmitted to humans by animals.

7.7 PERIODICALS

There are a wide variety of periodicals available which specialize in toxicology and occupational hygiene. Examples include:

7.7.1 AMERICAN INDUSTRIAL HYGIENE ASSOCIATION JOURNAL

AIHA
475 Wolf Ledges Parkway
Akron, Ohio
USA 44311

7.7.2 APPLIED INDUSTRIAL HYGIENE

ACGIH Inc.
6500 Glenway Avenue, Building D-7
Cincinnati, Ohio
USA 45211

7.7.3 AMERICAN JOURNAL OF INDUSTRIAL MEDICINE

Alan R. Liss
41 East 11th Street
New York, NY
USA 10003

7.7.4 ANNALS OF OCCUPATIONAL HYGIENE

Pergamon Press
Maxwell House, Fairview Park
Elmsford, NY
USA 10523

7.7.5 ARCHIVES OF ENVIRONMENTAL HEALTH

Heldref Publications
4000 Albermarle Street NW
Washington, DC
USA 20016

7.7.6 BRITISH JOURNAL OF INDUSTRIAL MEDICINE

British Medical Association
BMA House, Tavistock Square
London, England
UK WC1H 9JR

7.7.7 CA SELECTS: CHEMICAL HAZARDS HEALTH AND SAFETY

Chemical Abstracts Service
Box 3012
Columbus, Ohio
USA 43210

7.7.8 EXCERPTA MEDICA, SECTION 35,
OCCUPATIONAL HEALTH AND INDUSTRIAL MEDICINE

Elsevier Science Publications
52 Vanderbilt Avenue
New York, NY
USA 10017

7.7.9 HAZARDOUS CHEMICALS INFORMATION ANNUAL

Irving Sax, Ed.
Van Nostrand Reinhold
115 Fifth Avenue
New York, NY
USA 10003

7.7.10 INTERNATIONAL ARCHIVES OF
OCCUPATIONAL AND ENVIRONMENTAL HEALTH

Springer Verlag
Journal Prod. Dept. 11
Postfach 10 52 80
D-6900 Heidelberg
Germany

7.7.11 JOURNAL OF OCCUPATIONAL MEDICINE

Industrial Medicine Association
150 North Wacker Drive
Chicago, IL
USA 60606

7.7.12 OCCUPATIONAL HEALTH AND SAFETY CANADA

Corpus
1450 Don Mills Road
Don Mills, Ontario
M3B 9Z9

7.7.13 SCANDINAVIAN JOURNAL OF
WORK, ENVIRONMENT AND HEALTH

Haartmanikatu 1
Helsinki 29
Finland

7.8 REFERENCES FOR FURTHER INFORMATION ON RESOURCES

7.8.1 "Computerized Information Resources in Toxicology and Industrial Health -- A Review" by David M. Halton, CCOHS as published in Toxicology and Industrial Health, Vol. 2, No. 1, 1986, pp. 113-125.

7.8.2 Industrial Hygiene: A Guide to Technical Information Sources, by M.E. Tucker, published by the American Industrial Hygiene Association, 1984.